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FORESTRY AND IRRIGATION is the official organ of the American Forestry Association. Price, \$2.00 per year, including Annual Membership in the Association. Entered at the Postoffice at Washington, D. C., as second-class mail matter.

Published Monthly at

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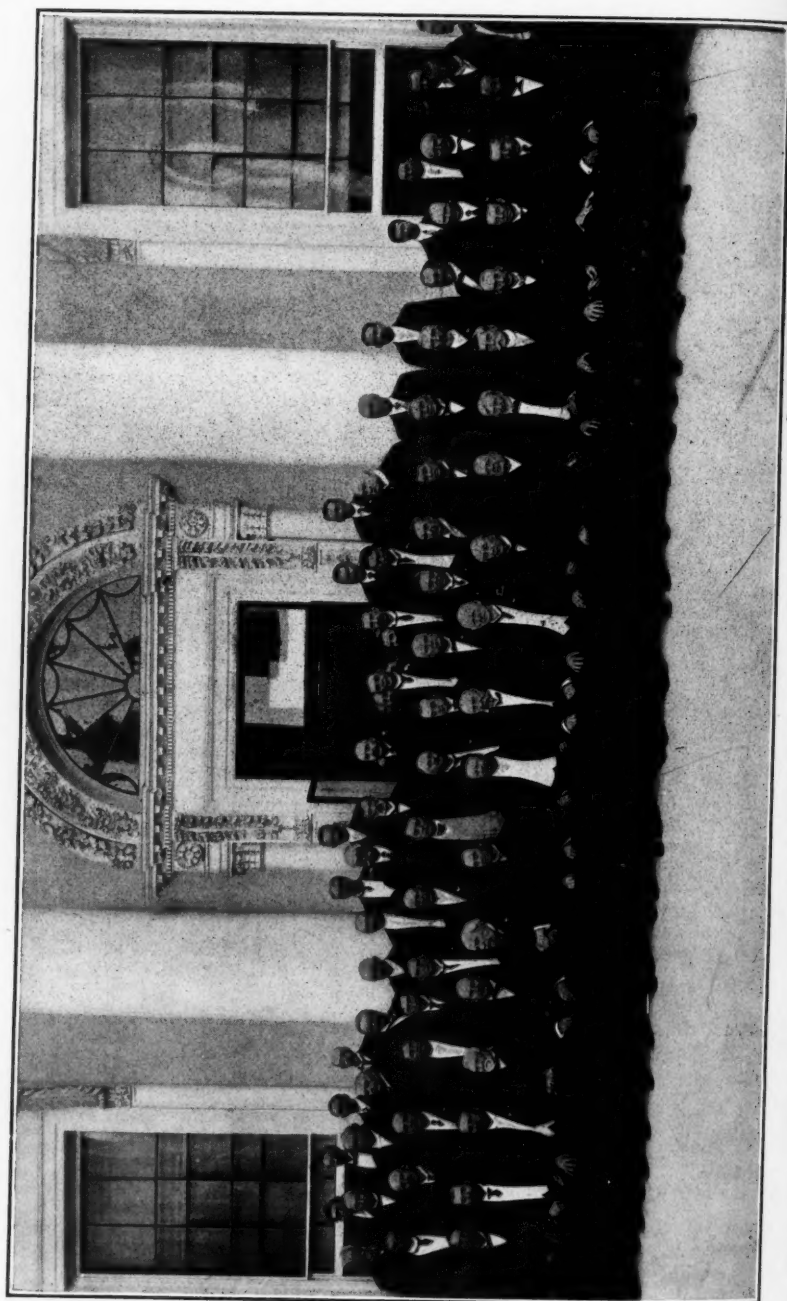
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FORESTRY AND IRRIGATION

Vol. XIV.

JUNE 1908.

No. 6.

THE GOVERNORS' CONFERENCE

Historic Gathering at the White House—Executives of Nearly
All the States and Territories Present—Steps Taken
Toward Permanent Organization—The
Story of the Conference

BY

Frank Glover Heaton, Editor of Forestry and Irrigation.

*There is neither East or West—
Border, nor breed, nor birth—
When two strong men stand face to face,
Though they come from the ends of the earth.*

—Kipling.

IT was a gathering of strong men, that White House Conference—a meeting of the strongest men in the public life of America, called by one of the strongest Chief Executives the Nation has had; and the questions considered were those upon the finding of correct answers to which the abiding prosperity of this, the greatest Nation that has arisen in the world's history, absolutely depends.

"Conservation." That was the keynote of the Conference from the opening address to the close of the final session. Not the miserly hoarding of

the country's resources, but the wise husbanding of timber and coal, of ores and soil, of waters and all the natural wealth which which the Western hemisphere is so richly endowed, and the fullest proper utilization of these resources, that their benefits may be shared equally among the whole people, and that they may be passed on, a practically undiminished capital, to the generations to come.

Crystallized into as brief a paragraph as possible, the sentiment of the Conference was that the work of conservation of all natural resources—

forests, minerals, soils and waters—should be left as largely as possible to the several states, and that a permanent organization of the State Executives should be made, through which the will of the people of the several states shall be expressed, and a comprehensive plan of Nation-wide conservation shall be formulated and carried out by the States, working in concert among themselves and with the Nation.

The tangible results of the Conference, generally speaking, are: The

has the President of the United States met in consultation with the Executives of practically all the states and territories for the consideration of any questions, big or little. And practically every speaker, from President Roosevelt on through the list, emphasized the statement that from the meeting in the East Room of the White House would undoubtedly spring an organization of the Governors that, through its deliberations and the weight of its matured opinions, would exercise, in the years to come, a tre-

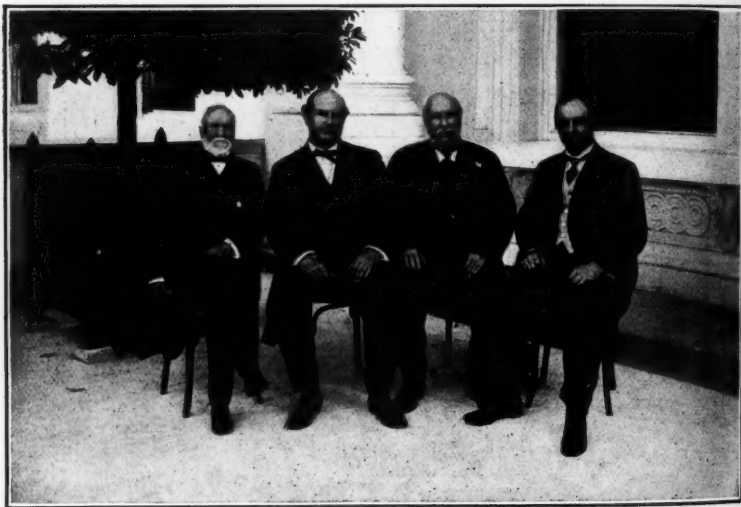


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GUESTS OF THE PRESIDENT

Mr. Andrew Carnegie, Hon. W. J. Bryan, Messrs. J. J. Hill, and John Mitchell

formation of a permanent organization of state Executives, and the arousing of a degree of interest among the Governors that resulted in the announcement by several of them that their first official act upon returning to their home states from the Conference will be the appointment of State Forestry Commissions.

From the opening to the close of the Conference stress was frequently laid upon the great historical significance of the gathering, and repeated references were made to the fact that never before in the Nation's history

measured influence over the destinies and the affairs of the Nation.

With the severe simplicity of its ordinary decoration brightened by draperies of green velvet that overspread almost all the east wall and the platform erected there for the presiding officer, the speakers, and the members of President Roosevelt's Cabinet, the East Room presented an unfamiliar appearance. Two great maps, prepared especially for the Conference, hung on the east wall, one of these maps showing the timber resources of the United States, while the other il-

illustrated the country's mineral deposits. Between these maps, which were the largest, it is said, ever made by mechanical means, an arrangement was provided whereby the different phases of conservation were illustrated by means of superb transparencies. The light for illuminating these transparencies came from a window in the east wall, and the scenes were frequently changed.

On the floor the seating plan had

excellent arrangement of details for making the labors of the Conference as easy as possible.

The membership of this, the initial assembly of what is undoubtedly to develop into one of the most important deliberative and advisory bodies the country has ever known, follows:

Special guests of President Roosevelt:

Hon. William Jennings Bryan, Mr. Andrew Carnegie, Mr. James J. Hill,

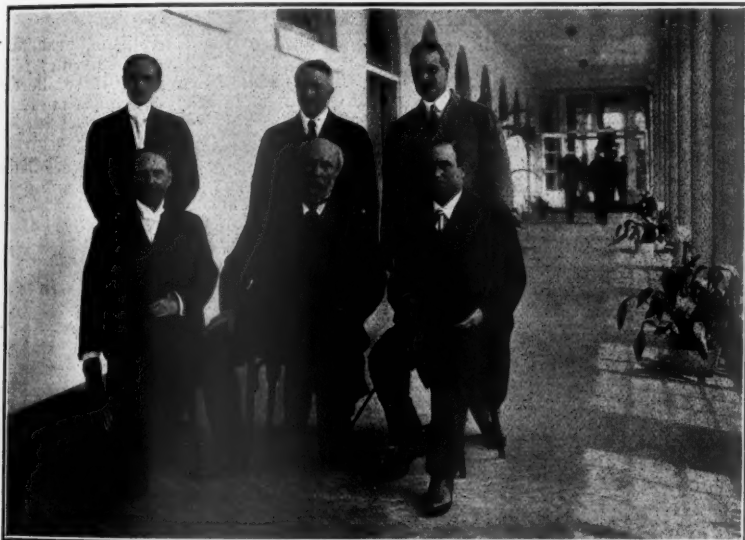


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SOME OF THE SPEAKERS

Standing—Profs. R. A. Long, J. C. White, and H. S. Putnam
Sitting—Dr. George A. Pardee, J. J. Hill, John Mitchell.

been worked out most admirably. Immediately in front of the platform special chairs for the Governors were ranged in semi-circles, while to the rear and at the sides of these were seats for the Governors' advisers and the other members of the Conference. The problem of seating all the conferees in the limited space was no small one in itself, and its satisfactory working out reflected credit upon the general secretary of the Conference, Mr. Thomas R. Shipp, to whom is also due a share of the credit for the

and Mr. John Mitchell. Owing to his recent illness, former President Cleveland was unable to attend the Conference.

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Representatives of national organizations interested in the different phases of conservation:

American Association of Agricultural Colleges and Experiment Stations, President, J. L. Snyder, Lansing, Mich.

American Association for the Advancement of Science, President, T. C. Chamberlin, University of Chicago, Chicago, Ill.

American Academy of Political and Social Science, President, L. S. Rowe, University of Pennsylvania, Philadelphia, Pa.

American Bar Association, President, J. M. Dickinson, Park Row, Chicago, Ill.

American Chemical Society, President, Marston T. Bogart, Columbia University, New York City.

President, John Hays Hammond, New York City.

American National Livestock Association, President, H. A. Jastro, Bakersfield, Cal.

American Newspaper Publishers' Association, President, Herman Ridder, New York City.

American Public Health Association, President, Dr. Richard H. Lewis, Raleigh, N. C.

American Pulp and Paper Association, President, David S. Cowles, New York City.

American Railway Association, President, F. A. Delano, New York City.

American Railway Engineering and Maintenance of Way Association, President, Walter G. Berg, New York City.

American Railway Master Mechanics Association, President, Wm. McIntosh, Jersey City, N. J.

American Scenic and Historic Preservation Society, President, Dr. Geo. G. Kunz, New York City.

American Society of Civil Engineers, President, Chas. MacDonald, New York City.

American Society of Mechanical Engineers, President, M. L. Holman, St. Louis.

American Society for Testing Materials, President, Chas. B. Dudley, Altoona, Pa.

American Statistical Association, President, Hon. Carroll D. Wright, Worcester, Mass.

Atlantic Deep Waterways Association, President, J. Hampton Moore, Philadelphia, Pa.

Brotherhood of Locomotive Engineers, Brotherhood of Locomotive Firemen and Engineers, Brotherhood of Railroad Trainmen, H. R. Fuller, Washington, D. C.

Business Men's League, President, James E. Smith, St. Louis, Mo.

Carriage Builders' National Association, President, J. B. Dort, Flint, Michigan.

Chautauqua Institute, President, Dr. George H. Vincent, University of Chicago, Ill.

Farmers' National Congress, President, B. Cameron, Stagville, N. C.

General Federation of Women's Clubs, President, Mrs. Sarah S. Platt Decker, Denver, Colo.

Geological Society of America, President, Samuel Calvin, Iowa City, Iowa.

Interstate Inland Waterway, President, C. S. E. Holland, Victoria, Texas.

Interstate Mississippi River Improvement and Levee Association, President, Chas. Scott, Rosedale, Miss.

Lake Carriers' Association, President, William Livingston, Detroit, Mich.

Lakes-to-the-Gulf Deep Waterways Association, President, W. K. Kavanaugh, St. Louis, Mo.

Mining Congress of America, President, J. H. Richards, Boise, Idaho.

Missouri Valley Improvement Association, President, Lawrence M. Jones, Kansas City, Mo.

National Academy of Sciences, President, Ira Remsen, Baltimore, Md.

National Advisory Board Fuels and Structural Materials, Vice-Chairman, Robt. W. Hunt.

National Association of Cotton Manufacturers, President, W. D. Hartshorne, Lawrence, Miss.

National Association of Manufacturers, President, James W. Van Cleave, St. Louis, Mo.

National Association of Agricultural Implement and Vehicle Manufacturers, President, Newell Sanders, Chatanooga, Tenn.

National Association of State Universities, President, Chas. R. Van Hise, Madison, Wis.

National Board of Fire Underwriters, Powell Evans, Chicago, Ill.

National Board of Trade, Vice-President, Frank L. Lanne, Philadelphia, Pa.

National Business League of America, A. A. Burnham, Chicago.

National Civic Federation, President, Seth Low, New York City.

National Council of Commerce, President, Gustav H. Schwab, New York City.

National Editorial Association, President, Henry B. Varner, Lexington, N. C.

National Educational Association, President, Dr. E. G. Cooley, Supt. of City Schools, Chicago, Ill.

National Electric Light Association, President, D. Farrand, Newark, N. J.

National Geographic Society, President, Willis L. Moore, Washington, D. C.

National Grange, President, N. J. Bachelder, Concord, N. H.

National Hay Association, President, Chas. J. Austin, New York City.

National Irrigation Congress, President, Frank C. Goudy, Denver, Colo.

National Lumber Manufacturers' Association, President, Wm. Irvine, Chippewa Falls, Wisconsin.

National Rivers and Harbors Congress, President, Hon. Jos. E. Ransdell, Lake Providence, La.

National Slack Cooperage Manufacturers' Association, President, H. M. Schmoldt, Beardstown, Ill.

National Wagon Manufacturers' Association, President, Richard Carpenter, La Fayette, Indiana.

National Wool Growers' Association, President, Fred Gooding, Shoshone, Idaho.

Ohio Valley Improvement Association, President, Col. John L. Vance, Cincinnati, Ohio.

Society for the Promotion of Engineering Education, President, Chas. S. Howe, Case School of Applied Science, Cleveland, Ohio.

Society of American Foresters, Overton W. Price, Forest Service, Washington.

Trans-Mississippi Commercial Congress, President, J. B. Case, Abilene, Kans.

United Mine Workers of America, President, T. L. Lewis, Indianapolis, Ind.

Upper Mississippi River Improvement Association, President, Thomas Wilkinson, Burlington, Iowa.

Besides these delegates, members of the United States Supreme Court, members of the Cabinet, and members of Congress, together with representatives of the press, made up the personnel of the Conference.

FIRST DAY'S SESSIONS

Called to order at 11 o'clock on Wednesday, May 13, by the President, the session was opened with a reading from the Scriptures by the Rev. Edward Everett Hale, followed by a prayer by the venerable chaplain. Following the invocation, President Roosevelt addressed the Conference in a speech that sounded the keynote of the meeting. The President's address follows:

Governors of the Several States and Gentlemen:

I welcome you to this Conference at the White House. You come hither at my request so that we may join together to consider the question of the conservation and use of the great fundamental sources of wealth of this Nation. So vital is this question that for the first time in our history the chief executive officers of the states separately, and of the states together forming the Nation, have met to consider it.

With the governors come men from each state, chosen for their special acquaintance with the terms of the problem that is before us. Among them are experts in natural resources and representatives of national organizations concerned in the development and use of these resources; the Senators and Representatives in Congress; the Supreme Court, the Cabinet, and the Inland Waterways Commission have likewise been invited to the Conference, which is therefore national in a peculiar sense.

This Conference on the conservation of natural resources is in effect a meeting of the representatives of all the people of the United States, called to consider the mightiest problem now before the Nation; and the occasion for the meeting lies in the fact that the natural resources of our country are in danger of exhaustion if we permit the old, wasteful methods of exploiting them longer to continue.

With the rise of peoples from savagery to civilization, and with the consequent growth in the extent and variety of the needs of the average man, there comes a steadily increasing growth of the amount demanded by this average man from the actual resources of the country. Yet, rather curiously, at the same time, the average man is apt to lose his realization of this dependence upon nature.

Savages, and very primitive peoples generally, concern themselves only with superficial natural resources; with those which they obtain from the actual surface of the ground. As people become a little less primitive, their industries, although in a rude manner, are extended to resources below the surface; then, with what we call

civilization and the extension of knowledge, more resources come into use, industries are multiplied, and foresight begins to become a necessary and prominent factor in life. Crops are cultivated; animals are domesticated; and metals are mastered.

Every step of the progress of mankind is marked by the discovery and use of natural resources previously unused. Without such progressive knowledge and utilization of natural resources population could not grow, nor industries multiply, nor the hidden wealth of the earth be developed for the benefit of mankind.

From the beginnings of civilization, on the banks of the Nile and the Euphrates, the industrial progress of the world has gone on slowly, with occasional setbacks, but on the whole steadily, through tens of centuries to the present day. But of late the rapidity of the process has increased at such a rate that more space has been actually covered during the century and a quarter occupied by our national life than during the preceding six thousand years that take us back to the earliest monuments of Egypt, to the earliest cities of the Babylonian plain.

When the founders of this Nation met in Independence Hall, in Philadelphia, the conditions of commerce had not fundamentally changed from what they were when the Phoenician keels first furrowed the lonely waters of the Mediterranean. The differences were those of degree, not of kind, and they were not in all cases even those of degree. Mining was carried on fundamentally as it had been carried on by the Pharaohs in the countries adjacent to the Red Sea.

In 1776 the wares of the merchants of Boston, of Charleston, like the wares of the merchants of Nineveh and Sidon, if they went by water, were carried by boats propelled by sails or oars; if they went by land, were carried in wagons drawn by beasts of draft or in packs on the backs of beasts of burden. The ships that crossed the high seas were better than the ships that 3,000 years before crossed the Aegean; but they were of the same type, after all—they were wooden ships propelled by sails; and on land the roads were not as good as the roads of the Roman Empire, while the service of the posts was probably inferior.

In Washington's time anthracite coal was known only as a useless black stone; and the great fields of bituminous coal were undiscovered. As steam was unknown, the use of coal for power production was undreamed of. Water was practically the only source of power, save the labor of men and animals; and this power was used only in the most primitive fashion. But a few small iron deposits had been found in this country, and the use of iron by our countrymen was very small. Wood was prac-

tically the only fuel, and what lumber was sawed was consumed locally, while the forests were regarded chiefly as obstructions to settlement and civilization.

Such was the degree of progress to which civilized mankind had attained when this Nation began its career. It is almost impossible for us in this day to realize how little our Revolutionary ancestors knew of the great store of natural resources whose discovery and use have been such vital factors in the growth and greatness of this Nation, and how little they required to take from this store in order to satisfy their needs.

Since then our knowledge and use of the resources of the present territory of the

Yet our fathers, though they knew so little of the resources of the country, exercised a wise forethought in reference thereto. Washington clearly saw that the perpetuity of the states could only be secured by union, and that the only feasible basis of union was an economic one; in other words, that it must be based upon the development and use of their natural resources. Accordingly, he helped to outline a scheme of commercial development, and by his influence an interstate waterways commission was appointed by Maryland and Virginia.

It met near where we are now meeting, in Alexandria, adjourned to Mount Vernon, and took up the consideration of interstate commerce by the only means then avail-



DESTRUCTION OF A WATERWAY
Formation of Silt Bar in a Navigable Stream

United States have increased a hundred-fold. Indeed, the growth of this Nation by leaps and bounds makes one of the most striking and important chapters in the history of the world. Its growth has been due to the rapid development, and alas! that it should be said, to the rapid destruction, of our natural resources. Nature has supplied to us in the United States, and still supplies to us, more kinds of resources in a more lavish degree than has ever been the case at any other time or with any other people. Our position in the world has been attained by the extent and thoroughness of the control we have achieved over nature; but we are more, and not less, dependent upon what she furnishes than at any previous time of history since the days of primitive man.

able, that of water. Further conferences were arranged, first at Annapolis and then at Philadelphia. It was in Philadelphia that the representatives of all the states met for what was in its original conception merely a waterways conference; but when they had closed their deliberations the outcome was the Constitution which made the states into a Nation. (Applause.)

The Constitution of the United States thus grew in large part out of the necessity for united action in the wise use of our natural resources. The wise use of all of our natural resources, which are our national resources as well, is the great material question of to-day. I have asked you to come together now because the enormous consumption of these resources, and the threat of imminent exhaustion of them,

due to reckless and wasteful use, once more calls for common effort, common action.

Since the days when the Constitution was adopted, steam and electricity have revolutionized the industrial world. Nowhere has the revolution been so great as in our own country. The discovery and utilization of mineral fuels and alloys have given us the lead over all other nations in the production of steel. The discovery and utilization of coal and iron have given us our railways, and have led to such industrial development as has never before been seen. The vast wealth of lumber in our forests, the riches of our soils and mines, the discovery of coal and mineral oils, combined with the efficiency of our transportation, have made the conditions of our life unparalleled in comfort and convenience.

The steadily increasing drain on these natural resources has promoted to an extraordinary degree the complexity of our industrial and social life. Moreover, this unexampled development has had a determining effect upon the character and opinions of our people. The demand for efficiency in the great task has given us vigor, effectiveness, decision, and power, and a capacity for achievement which in its own lines has never yet been matched. (Applause.) So great and so rapid has been our material growth that there has been a tendency to lag behind in spiritual and moral growth (laughter and applause); but that is not the subject upon which I speak to you to-day.

Disregarding for the moment the question of moral purpose, it is safe to say that the prosperity of our people depends directly on the energy and intelligence with which our natural resources are used. It is equally clear that these resources are the final basis of national power and perpetuity. Finally, it is ominously evident that these resources are in the course of rapid exhaustion.

This Nation began with the belief that its landed possessions were illimitable and capable of supporting all the people who might care to make our country their home; but already the limit of unsettled land is in sight, and indeed but little land fitted for agriculture now remains unoccupied save what can be reclaimed by irrigation and drainage. We began with an unapproached heritage of forests; more than half of the timber is gone. We began with coal fields more extensive than those of any other nation, and with iron ores regarded as inexhaustible, and many experts now declare that the end of both coal and iron is in sight.

The mere increase in the consumption of coal during 1907 over 1906 exceeded the total consumption in 1876, the Centennial year. The enormous stores of mineral oil and gas are largely gone. Our natural waterways are not gone, but they have been so injured by neglect, and by the division

of responsibility and utter lack of system in dealing with them, that there is less navigation on them now than there was fifty years ago. Finally, we began with soils of unexampled fertility and we have so impoverished them by injudicious use and by failing to check erosion that their crop producing power is diminishing instead of increasing. In a word, we have thoughtlessly, and to a large degree unnecessarily, diminished the resources upon which not only our prosperity but the prosperity of our children must always depend.

We have become great because of the lavish use of our resources, and we have just reason to be proud of our growth. But the time has come to inquire seriously what will happen when our forests are gone, when the coal, the iron, the oil, and the gas are exhausted, when the soils shall have been still further impoverished and washed into the streams, polluting the rivers, denuding the fields, and obstructing navigation. These questions do not relate only to the next century or to the next generation. It is time for us now as a Nation to exercise the same reasonable foresight in dealing with our great natural resources that would be shown by any prudent man in conserving and wisely using the property which contains the assurance of well being for himself and his children.

The natural resources I have enumerated can be divided into two sharply distinguished classes accordingly as they are or are not capable of renewal. Mines if used must necessarily be exhausted. The minerals do not and cannot renew themselves. Therefore, in dealing with the coal, the oil, the gas, the iron, the metals generally, all that we can do is to try to see that they are wisely used. The exhaustion is certain to come in time.

The second class of resources consists of those which cannot only be used in such manner as to leave them undiminished for our children, but can actually be improved by wise use. The soil, the forests, and the waterways come in this category. In dealing with mineral resources, man is able to improve on nature only by putting the resources to a beneficial use, which in the end exhausts them; but in dealing with the soil and its products man can improve on nature by compelling the resources to renew and even reconstruct themselves in such manner as to serve increasingly beneficial uses—while the living waters can be so controlled as to multiply their benefits.

Neither the primitive man nor the pioneer was aware of any duty to posterity in dealing with the renewable resources. When the American settler felled the forests, he felt that there was plenty of forest left for the sons that came after him. When he exhausted the soil of his farm he felt that his son could go West and take up another. So it was with his immediate successors. When the soil-wash from the farmer's fields

choked the neighboring river he thought only of using the railway rather than boats for moving his produce and supplies.

Now all this is changed. On the average the son of the farmer of to-day must make his living on his father's farm. There is no difficulty in doing this if the father will exercise wisdom. No wise use of a farm exhausts its fertility. So with the forests. We are over the verge of a timber famine in this country, and it is unpardonable for the Nation or the states to permit any further cutting of our timber save in accordance with a system which will provide that the next generation shall see the timber increased instead of diminished. (Applause.) Moreover, we can add enormous tracts of the most valuable possible agricultural land to the national domain by irrigation in the arid and semi-arid regions and by drainage of great tracts of swamp lands in the humid regions. We can enormously increase our transportation facilities by the canalization of our rivers so as to complete a great system of waterways on the Pacific, Atlantic, and Gulf coasts and in the Mississippi Valley, from the Great Plains to the Alleghenies and from the northern lakes to the mouth of the mighty Father of Waters. But all these various cases of our natural resources are so closely connected that they should be co-ordinated, and should be treated as part of one coherent plan and not in haphazard and piecemeal fashion.

It is largely because of this that I appointed the Waterways Commission last year and that I have sought to perpetuate its work. I wish to take this opportunity to express in heartiest fashion my acknowledgment to all the members of the Commission. At great personal sacrifice of time and effort they have rendered a service to the public for which we cannot be too grateful. Especial credit is due to the initiative, the energy, the devotion to duty and the farsightedness of Gifford Pinchot (great applause), to whom we owe so much of the progress we have already made in handling this matter of the co-ordination and conservation of natural resources. If it had not been for him this convention neither would or could have been called.

We are coming to recognize as never before the right of the Nation to guard its own future in the essential matter of natural resources. In the past we have admitted the right of the individual to injure the future of the Republic for his own present profit. The time has come for a change. As a people we have the right and the duty, second to none other but the right and duty of obeying the moral law, of requiring and doing justice, to protect ourselves and our children against the wasteful development of our natural resources, whether that waste is caused by the actual destruction of such resources or by making them impossible of development hereafter.

Any right thinking father earnestly de-

sires and strives to leave his son both an untarnished name and a reasonable equipment for the struggle of life. So this Nation as a whole should earnestly desire and strive to leave to the next generation the national honor unstained and the national resources unexhausted. There are signs that both the Nation and the states are waking to a realization of this great truth. On March 10, 1908, the Supreme Court of Maine rendered an exceedingly important judicial decision. This opinion was rendered in response to questions as to the right of the legislature to restrict the cutting of trees on private land for the prevention of droughts and floods, the preservation of the natural water supply, and the prevention of the erosion of such lands, and the consequent filling up of rivers, ponds, and lakes. The forests and water powers of Maine constitute the larger part of her wealth and form the basis of her industrial life, and the question submitted by the Maine Senate to the Supreme Court and the answer of the Supreme Court alike bear testimony to the wisdom of the people of Maine, and clearly define a policy of conservation of natural resources, the adoption of which is of vital importance, not merely to Maine, but to the whole country. (Applause.)

Such a policy will preserve soil, forests, water power as a heritage for the children and the children's children of the men and women of this generation; for any enactment that provides for the wise utilization of the forests, whether in public or private ownership, and for the conservation of the water resources of the country, must necessarily be legislation that will promote both private and public welfare; for flood prevention, water power development, preservation of the soil, and improvement of navigable rivers are all promoted by such a policy of forest conservation.

The opinion of the Maine Supreme bench sets forth unequivocally the principle that the property rights of the individual are subordinate to the rights of the community, and especially that the waste of wild timber land derived originally from the State, involving as it would the impoverishment of the state and its people and thereby defeating one great purpose of government, may properly be prevented by state restrictions.

The court says that there are two reasons why the right of the public to control and limit the use of private property is peculiarly applicable to property in land: "First, such property is not the result of productive labor, but is derived solely from the state itself, the original owner; second, the amount of land being incapable of increase, if the owners of large tracts can waste them at will without state restriction, the state and its people may be helplessly impoverished and one great purpose of government defeated. * * * We do not

think the proposed legislation would operate to 'take' private property within the inhibition of the Constitution. While it might restrict the owner of wild and uncultivated lands in his use of them, might delay his taking some of the product, might delay his anticipated profits and even thereby might cause him some loss of profit, it would nevertheless leave him his lands, their product and increase, untouched, and without diminution of title, estate or quantity. He would still have large measure of control and large opportunity to realize values. He might suffer delay but not deprivation. * * *

The proposed legislation * * * would be within the legislative power and would not operate as a taking of private property for which compensation must be made."

The Court of Errors and Appeals of New Jersey has adopted a similar view, which has recently been sustained by the Supreme Court of the United States. In delivering the opinion of the court on April 6, 1908, Mr. Justice Holmes said: "The state, as quasi-sovereign and representative of the interests of the public, has a standing in court to protect the atmosphere, the water, and the forests within its territory, irrespective of the assent or dissent of the private owners of the land most immediately concerned. * * *

It appears to us that few public interests are more obvious, indisputable and independent of particular theory than the interest of the public of a state to maintain the rivers that are wholly within it substantially undiminished, except by such drafts upon them as the guardian of the public welfare may permit for the purpose of turning them to a more perfect use. (Applause.) This public interest is omnipresent wherever there is a state, and grows more pressing as population grows. * * *

We are of opinion, further, that the constitutional power of the state to insist that its natural advantages shall remain unimpaired by its citizens is not dependent upon any nice estimate of the extent of present use or speculation as to future needs. The legal conception of the necessary is apt to be confined to somewhat rudimentary wants, and there are benefits from a great river that might escape a lawyer's view. (Laughter and applause.) But the state is not required to submit even to an aesthetic analysis. Any analysis may be inadequate. It finds itself in possession of what all admit to be a great public good, and what it has it may keep and give no one a reason for its will."

These decisions reach the root of the

idea of conservation of our resources in the interests of the people.

Finally, let us remember that the conservation of our natural resources, though the gravest problem of to-day, is yet but part of another and greater problem to which this Nation is not yet awake, but to which it will awake in time, and with which it must hereafter grapple if it is to live—the problem of national efficiency, the patriotic duty of insuring the safety and continuance of the Nation. (Applause.) When the people of the United States consciously undertake to raise themselves as citizens, and the Nation and the states in their several spheres, to the highest pitch of excellence in private, state, and national life, and to do this because it is the first of all the duties of true patriotism, then and not till then the future of this Nation, in quality and in time, will be assured. (Great applause.)

Following the address of the President, it was suggested that, in order to expedite the work of the Conference, the special statements, or papers, to be presented by the "experts," be limited to twenty minutes; that discussion be limited to ten minutes, and that all resolutions be handed, without reading, to a committee on resolutions, such committee to be charged with the work of formulating the general conclusions of the Conference. In line with this suggestion President Roosevelt proposed Governors Blanchard, of Louisiana; Fort, of New Jersey; Cutler, of Utah; Davidson, of Wisconsin, and Ansel, of South Carolina, as a Committee on Resolutions, and on motion of Governor Johnson, of Minnesota, the suggestion was carried out. Dr. W J McGee, secretary of the Inland Waterways Commission, sat with the committee.

At the conclusion of the morning session the members of the Conference passed out through the Blue Room, where the President met and personally greeted each of the Governors and conferees.

AFTERNOON SESSION

When the afternoon session was called to order President Roosevelt announced that, owing to his multitudinous duties, it would be impossible

for him to preside over all of the sessions, and that he would call to the chair one or another of the Governors present to act in his place. The

President stated that he would open each session, remaining until after the reading of the first paper. Governor Noel, of Mississippi, was then called to the chair, the President retiring at the conclusion of the paper read by Mr. Andrew Carnegie. Mr. Carnegie's address dealt with the country's supplies of iron and related ores, and, being the statement of perhaps the best posted practical authority in the United States on this subject, it was received with careful attention. The address follows:

You have begun to make history to-day, for never before has the National Governor called all the state Governors into conference. The President has acted upon the axiom that while it is well to follow good precedents, it is better to make them. Washington in 1785 invited the Commissioners of Maryland and Virginia to Mount Vernon, when they conferred at Alexandria upon the joint regulation of the Potomac. This was the first slight revelation of the important interstate problems which lie imbedded in our Federal system. It is no new question with which you have to deal. My province to-day is to ask your attention to the situation as affected by our mineral supplies, chiefly iron and coal.

But let me first state that for all the data, facts, and much else used in this address I am indebted to Government officials of the Geological Survey and other scientific bureaus, the extent and variety of whose knowledge have much impressed me, although I have long known that our Government is celebrated for the range and thoroughness of its investigations and the amount of statistical information it has acquired and keeps up to date regarding the Nation and people. I have heard more than one prominent public man of other lands express admiration for our governmental reports.

Of all the world's metals, iron is in our day the most useful. The opening of the Iron Age marked the beginning of real industrial development. The mining of copper and tin and the making of bronze implements closed the Stone Age in Europe and Asia, but it was not until the smelting of iron started in Africa and spread to Europe that industrial progress began; in all countries the highest civilization has followed the use of iron in the arts and crafts. To-day the position of nations may almost be measured by its production and use.

Iron and coal are the foundation of our industrial prosperity. The value of each depends upon the amount and nearness of the other. In modern times the manufacturing and transportation industries rest upon them, and, given sufficient land area

and fertile soil, these determine the progress of any people. When the United States entered upon its unexampled career the extent and value of our deposits of iron and coal were unknown. It was only through the growth of population, increase of knowledge, and invention, that they gained such value as to render their quantity an important public question.

Iron smelting began with charcoal made in neighboring forests. Electrical smelting by means of water power has only recently been tried. To-day the reduction of our ores and the manufacture of iron practically rest upon the extent and availability of our coal.

When the Republic was founded there were, according to recent expert estimates, approximately 2,000,000,000 tons of coal in the territory now forming the United States. Practically none of this supply was used for over a quarter-century; but during the 75 years from 1820 to 1895 nearly 4,000,000,000 tons were mined by methods so wasteful that some 6,000,000,000 tons were either destroyed or allowed to remain in the ground, forever inaccessible. During the ten years from 1896 to 1906 as much was produced as during the preceding 75 years; while more than 3,000,000,000 tons were destroyed or left in the ground beyond reach of future use. To date the actual consumption of coal has been over 7,500,000,000 tons; the waste and destruction in the neighborhood of 9,000,000,000 tons. If mining were perfected from now forward we might reckon that considerably less than 1 per cent of our original stock has been consumed; but estimating on the basis of the wasteful methods hitherto pursued, nearly 2 per cent of our available supply is gone.

Coal consumption is increasing at an astonishing rate. During the period for which statistics have been gathered, it has doubled during each decade; of late it has more than doubled. In 1907 the production was about 450,000,000 tons. At the present rate of increase the production in 1917 will be 900,000,000 tons, in 1927 1,800,000,000 tons, and in 1937 over 3,500,000,000 tons, or an amount in that year alone nearly equal to the production of the 75 years ending in 1895; and with continuation of the wasteful methods of mining, the consumption and destruction together during that one year would equal our total useful production up to the present date. And at that time—which many of us will live to see—more than an eighth of our estimated original supply will have been consumed or destroyed.

All estimates of future consumption and destruction of coal are liable to error; yet making all reasonable allowance, unless there be careful husbanding, or revolutionizing inventions, or some industrial revolution comes which cannot now be foreseen, the greater part of that estimated 2,000,-

000,000,000 tons of coal forming our original heritage will be gone before the end of the next century, say two hundred years hence.

To each generation the ultimate disappearance of coal is of less concern than current prices. With the working out of seams and fields, plants and transportation facilities are removed or abandoned, and other losses are incurred; and the cost of these in the end increases prices. Already this is felt; it is estimated that by reason of the progressive exhaustion of American fields, coal consumers are to-day paying on an average 10 per cent or 15 per cent more than would be necessary if the supply were unlimited—and the advance must continue with each decade as the supply lessens.

Still more wasteful than our process of mining are our methods of consuming coal. Of all the coal burned in the power plants of the country not more than from 5 per cent to 10 per cent of the potential energy is actually used; the remaining 90 per cent to 95 per cent is absorbed in rendering the smaller fraction available in actual work. In direct heating the loss is less, but in electric heating and lighting it is much more—indeed in ordinary electric light plants hardly one-fifth of 1 per cent, one five-hundredth part, of the energy of the coal is actually utilized. There is at present no known remedy for this. These wastes are not increasing; through the development of gas-producers, internal combustion engines, and steam turbines they are constantly decreasing; yet not so rapidly as to affect seriously the estimates of increase in coal consumption. We are not without hope, however, of discoveries that may yet enable man to convert potential into mechanical energy direct, avoiding this fearful waste. If that day ever comes, our coal supply might be considered unending.

The same spirit of recklessness that leads to waste in mining and in the consumption of coal leads to unnecessary risk of human life. During the year 1907 in the United States the killed and wounded in coal mining operations exceeded 9,000. The danger to life and limb in the mines is increasing far more rapidly than production, because gas becomes more abundant and the work of rescue more difficult as the mines extend deeper or farther from the entrance.

When the Republic was started in 1776 little iron was used. Each family was content with a few score pounds in the form of implements, utensils, and weapons, so that the average annual consumption was but a few pounds per capita. In 1907 alone the production of iron ore in the United States was 53,000,000 tons, or more than 1,200 pounds for each man, woman and child of our 88,000,000 population. And the production is steadily increasing.

The latest trustworthy estimates of our present stock of iron ore are: for the Lake Superior district, about 1,500,000,000 tons;

for the Southern district (including Alabama, Georgia, Tennessee, and Virginia), about 2,500,000,000 tons; and for the rest of the United States, 5,000,000,000 to 7,000,000,000 tons—making an aggregate of about 10,000,000,000 tons.

Our highest-grade ore is that of the Lake Superior district, which yields about four-fifths of the current production. In 1905 its yield was over 33,000,000 tons, in 1906 some 38,000,000 tons, and in 1907 nearly 44,000,000 tons; by the end of the present decade it will average 50,000,000 tons or more. Even without further increase, the known supply will be exhausted before 1940. It is true that there are frequent reports of new ore bodies in this district; but on the other hand, the old bodies generally run far below the estimates.

The total production of iron ores in the United States up to 1890 was some 275,000,000 tons; in the next ten years it was nearly 200,000,000; and in the seven years from 1901 to 1907 more than 270,000,000 tons were produced, or nearly as much as the total for the first century of our history. The aggregate production to date, 750,000,000 tons, is about one-thirteenth of the estimated original supply. At the present rate of increase (doubling each decade) the production in 1918 will exceed 100,000,000 tons, by 1928 200,000,000 tons, and by 1938 it will be over 400,000,000 tons—i. e., in that single year, which many of us may expect to see, an amount approximating the entire production in the United States up to the close of last year. By that date about half of the original supply will be gone, and only the lower grades of ore will remain; and all the ore now deemed workable will be used long before the end of the present century.

Compared with Britain or Germany, our only two important competitors in iron and steel, we were until the past few years in much more favorable condition. Britain then was apparently within twenty years of her end as an important steel producer, owing to exhaustion of her ore supplies. Recent discoveries in Northern Sweden have given her a new lease and also benefited Germany, both of which are already drawing part of their supply from the new mines, which are said to be by far the most extensive ever known. The ores are of excellent quality. It is not improbable that ere long we also in the Eastern States shall be compelled to rely upon these deposits for part of our supply.

While both waste and risk of life in the mining and reduction of iron ore are much less relatively than in coal mining, the advances in price due to progressive exhaustion are large. An example is found in Iron Mountain, Missouri, which forty-odd years ago was declared, even by experts, to be inexhaustible; the entire deposit is gone—work abandoned. The additional cost of ore due to progressive exhaustion of the

bodies of ore can hardly be estimated at less than 10 per cent; this is already felt, and must increase as field after field is exhausted.

Next to iron our most useful metal is copper. It was the only metal used effectively by the natives of North America before Columbus landed; and for over three centuries native copper was mined and wrought by white men chiefly in Indian mines and by Indian methods. The mining and reduction of copper ores has grown up within 50 years; and within a dozen years the copper industry has been revolutionized through electrical application. Although production is enormous and increasing apace, it fails to keep up with the demand, which more than in any other commodity is limited by price. If the current price could be reduced 35 per cent the demand would be doubled or tripled; if it could be reduced 50 per cent copper would replace iron for roofing, cornices, piping, and other constructional purposes so as to raise the demand ten-fold, if not more. While the stock of copper in the ground has not been estimated (miners and operators deeming the supply unlimited, just as a generation ago they thought iron inexhaustible), unless the quantity exceeds the indications, it clearly cannot long withstand the demands which would follow any great reduction in price. Unless it does so, the use of copper cannot seriously check the drain upon our iron resources.

Zinc, lead, silver and other ores abound in our rocks, and their production is steadily increasing. Neither the original supplies nor the time they will last have been estimated; it is known only that one mine or district after another has been worked out, or the depths of the workings so increased as to raise the cost to a prohibitive figure and compel abandonment. The current and avoidable waste in mining and reducing these and the copper ores is estimated by experts to average 30 per cent.

As iron and coal are the basis of industrial values, so gold is the basis of commercial values. Tho there is enough gold-bearing mineral in the United States to give us a powerful influence in maintaining parity of gold, the aggregate supply has not been estimated—indeed it cannot be, since nearly all rocks and earths and even the waters contain gold in various quantities, so that production is controlled wholly by the market price. Our production is large and steadily increasing; tho the increase does not quite keep pace with that of such staples as corn, cotton, wheat, sugar, iron, coal, copper, silver, lead, and zinc. Doubtless the duration of the supply will depend solely upon commercial conditions. The waste in mining and reduction has always been large, ranging from 25 per cent to 50 per cent—indeed it is not uncommon for later miners to get their best returns from working the tailings left by their predecessors.

In view of the sobering facts presented, the thoughtful man is forced to realize, first, that our production and consumption of minerals are increasing much more rapidly than our population; and, second, that our methods are so faulty and extravagant that the average waste is very great, and in coal almost as great as the amount consumed. The serious loss of life in the mines is a feature that can no longer be overlooked. Nor can we fail to realize that the most useful minerals will shortly become scarce, and may soon reach prohibitive cost unless steps to lessen waste are taken in the interest of the future.

I have for many years been impressed with the steady depletion of our iron ore supply. It is staggering to learn that our once supposed ample supply of rich ores can hardly outlast the generation now appearing, leaving only the leaner ores for the later years of the century. It is my judgment, as a practical man accustomed to dealing with those material factors on which our national prosperity is based, that it is time to take thought for the morrow. I fully concur in the opinion of the President that the state of our resources raises one of the most serious issues now before the American people, and hope that this National meeting will lead to wise action.

We are nationally in the position of a large family receiving a rich patrimony from thrifty parents deceased intestate; the President may be likened to the eldest son and the Governors to younger brothers, jointly responsible for the minors; the experts assembled may be likened to the family solicitors. Now, the first duty of such a family is to take stock of its patrimony; the next to manage the assets in such manner that none shall be wasted, that all be put to the greatest good of the living and their descendants. Now, we have just begun to take stock of our national patrimony; and it is with the deepest sense of responsibility imposed upon me by the invitation to this meeting, to the Nation and to coming generations of all time, that I speak as one of the junior solicitors. In my opinion we should watch closely all the assets and begin both to save and to use them more wisely.

Let us begin with iron: We must in all possible ways lessen the demands upon it, for it is with iron ore we are least adequately provided. One of the chief uses of this metal is connected with transportation, mainly by rail. Moving 1,000 tons of heavy freight by rail requires an 80-ton locomotive and twenty-five 20-ton steel cars (each of 40-ton capacity), or 580 tons of iron and steel, with an average of, say, ten miles of double track (with 90-pound rails), or 317 tons additional; so that, including switches, frogs, fish-plates, spikes, and other incidentals, the carrier requires the use of an equal weight of metal. The same freight may be moved by water by means of 100 to 250 tons of metal, so that the substitution

of water-carriage for rail-carriage would reduce the consumption of iron by three-fourths to seven-eighths in this department. At the same time the consumption of coal for motive power would be reduced 50 per cent to 75 per cent, with a corresponding reduction in the coal required for smelting. No single step open to us to-day would do more to check the drain on iron and coal than the substitution of water-carriage for rail-carriage wherever practicable, and the careful adjustment of the one to the other throughout the country.

The next great use of iron is in construction, especially of buildings and bridges. Fortunately the use of concrete, simple and reinforced, is already reducing the consumption of structural steel. The materials for cement and concrete abound in every part of the country; and while the arts of making and using them are still in their infancy, the products promise to become superior to steel and stone in strength, durability, convenience, and economy of use. The cement industry is growing rapidly, largely in connection with the making of iron and steel so that the substitution of the new material will not involve abandonment of plants or loss of invested capital. The hitherto useless slag hills, of which many may be seen around blast furnaces, are now being made directly into cement and yielding high profits. It has become a by-product, the extra cost scarcely more than the former cost of piling the slag away.

A large current use of steel of the highest quality is for battleships, ordnance, projectiles and small arms. Happily there are signs of an awakening of the public conscience and of the sense of national righteousness, whereby civilized nations must be led to adopt those moral standards which already regulate individual conduct; the world is soon to learn that war is not only too disgracefully inhuman but too wasteful to be tolerated, and this serious drain upon our iron ores will cease.

A promising mode of reducing iron consumption is opening through the development of iron alloys. The making of steel was first an accident, and long a secret "art and mystery;" it was not until after the Republic was founded that steel was recognized as an alloy of iron and carbon, and it was only within the memory of men now present that nickel, silver, zircon, tungsten, and other materials were scientifically alloyed with iron to yield those protean modern steels adapted to an ever-increasing range of uses. And the end is not yet; every expert knows that metal alloying is in its infancy.

Among the most abundant materials of the earth-crust are silica, alumina, and carbon compounds, all with more or less affinity for iron; already the alloying of carbon with iron has revolutionized the industrial world, and of late the alloying of silica with iron (in "ferro-silicon," etc.) gives

promise not only of yielding a superior metal but of permitting reduction of siliceous ores hitherto unworkable, while alumina has been alloyed with iron in a useful way. It is not too much to hope that research into the ultimate constitution and relation of these commoner materials will yield both better and cheaper metals than any thus far produced, and that newly discovered alloys will help to relieve the pressure on our mines of iron, copper, zinc, silver, and lead.

We now come to coal. How shall we save that? Current uses—or rather current wastes—offer suggestions: The most serious waste arises from imperfect combustion in furnace and firebox. The waste of 90 per cent and over of the potential energy of the fuel in power-production—which, however, we know not yet how to avoid—is appalling in itself, while the smoke and soot from the chimneys becloud and befoul cities, poison human lungs and prepare the way for pneumonia (one of our worst modern scourges), and initiate all manner of additional wastes. We have already learned that internal-combustion engines and gas-producers double or triple the power per unit of coal, obviate the smoke nuisance and also permit the use of lignite, culm, slack, and inferior coals—in fact, so far as power-production by reciprocal engines is concerned, the days of steam seem to be numbered, although development of substitutes is still in its infancy. The consumption of substitutes is still in its infancy. The consumption of coal in smelting is necessarily large; of late the loss is reduced by using the furnace-gases for power, and by making by-products; yet the chief saving must lie in economy in the use of metals. Much of our coke-making is still extravagant; some ovens use the gases, and all should do so without delay—if necessary, under State regulation, since the people have some rights both in the preservation of their heritage and in maintaining the purity of the air they breathe.

Next to imperfect combustion, the chief waste of coal arises in mining. The early colliers saw no value in coal in the ground, any more than early millers saw value in the flow of the stream; to them coal acquired value only by the labor of mining it, just as to the miller the stream acquired value only as head was produced by the labor of building dam and mill. So the coal taken out in the British and German collieries was a sort of treasure trove; that left in the ground was nobody's loss. Likewise in early American mining the coal mined merely yielded a return for labor, and the pillars and slack and poor coal left in the ground were nobody's affair; it was years after mining began before coal lands were thought to have any other value than as wood-lands or farm-lands. Thus the incredibly wasteful methods were natural

enough; if labor could be saved and profits gained by taking out but a third or a half of the richest part of the seam, leaving the rest to be rendered inaccessible by caving, so be it. No one thought of it as improvident. Now that the coal in the ground is recognized as part, and a great part, of the value of coal lands, self-interest impels the operator to take out all he can, and leads the miner to work close to floor and roof. Bad results may sometimes follow, as in the anthracite region, where the entire forest growth has been stripped and both land and streams ruined to timber the mines, and in those terrible accidents when in removing the pillars of coal the miners are buried. Coal mining cries out for expert knowledge whereby the full yield may be obtained without needless risk or loss; and for wise police regulation whereby life may be protected against ignorance and cupid-

ity. The most promising check on coal consumption is the substitution of other power. Naturalists tell us that coal is a reservoir of solar energy stored up in ages past, and that the same is partly true also of other chemically complex substances, including ores. The sun-motor still runs; its rays render the globe habitable, and may yet be made to produce power by solar engines or may be concentrated in furnaces—as in the Portuguese priest's heliophore at the St. Louis Exposition, with its temperature of 6,000 degrees F., in which a cube of iron evaporated like a snowball in a Bessemer converter. The sun helps to raise the tides, which some day will be harnessed; and still more practically it raises vapor from the sea to fall as rain and supply our mill-streams and rivers, which it is estimated may some day yield over 30,000,000 horsepower—or more than all now produced from fuel by all our engines combined. Dr. Pritchett is responsible for the statement that on a clear day, when well above the horizon, the sun delivers upon each square acre of the earth's surface exposed to its rays the equivalent of 7,500 horsepower, working continuously. Thus, there is abundance of power lying around us, if we only knew how to harness it. It is only within the past decade that electrical transmission has made water-power generally available for driving machinery, for smelting, and for moving trains, and has at the same time created a new market for copper; yet it is a safe forecast that this method of using solar energy (for such water is as the product of sun heat) will soon affect the constantly increasing drain on our coal. And just as the woods and the ores and the mineral fuels have become sources of wealth and power within our memory, so will become the running waters within a few years!

No practical man can study our mineral supplies without seeing that they are melting away under our national growth at a

geometrically increasing rate, and without realizing that unless the loss is checked his descendants must suffer; nor can he consider ways of preserving the supply without realizing the need of wider and deeper knowledge than we now possess. It was not resources alone that gave this country its prosperity, but inventive skill and industrial enterprise applied to its resources. Individually we have been both forehanded and foreminded. Nationally we have been forehanded chiefly by the accident of discovery by John Smith and Walter Raleigh, but nationally we are not yet foreminded. So far as our mineral wealth is concerned, the need of the day is prudent foresight, coupled with ceaseless research in order that new minerals may be discovered, new alloys produced, new compounds of common substances made available, new power-producing devices developed. The most careful inventory of the family patrimony should be made. I plead for economy, that the next generation and the next may be saved from want—but especially I urge research into and mastery over Nature, in order that two blades may be made to grow where one grew before, that the golden grain may be made to replace woody grass, that crude rocks may be made to yield fine metals.

I urge on the Executives here assembled as our greatest need to-day the need for better and more practical knowledge. It was never more true than now that "Knowledge is power." The states have done much, the Federal Government has done much, individual men have done much for research; in the history of this country knowledge has advanced as never before, and thereby the materials and forces of nature have been brought under control as no man dreamed when the Nation was founded. Yet if our career of prosperity is to continue, it must be on the basis of completer control of national sources of material and power than we have thus far exercised, a control to be gained only by research.

In conclusion, Mr. President and Governors of our states, it seems to me our duty is:

First, conservation of forests, for no forests, no long navigable rivers; no rivers, no cheap transportation.

Second, to systematize our water transportation, putting the whole work in the hands of the Reclamation Service, which has already proved itself highly capable by its admirable work. Cheap water transportation for heavy freights brings many advantages and means great saving of our ore supplies. Railroads require much steel, water does not.

Third, conservation of soil. More than a thousand millions of tons of our richest soil are swept into the sea every year, clogging the rivers on its way and filling our harbors. Less soil, less crops; less crops, less commerce, less wealth.

The way is not new: Washington and his compatriots pushed into the unknown in projecting a Nation on new principles. Franklin grasped a hardly known principle through the Geneva Treaty, and Jefferson seized an unexplored half-continent despite protests of those whose knowledge was even less than his own; Fulton, Morse, Henry, Edison and Beil came to stand as kings among men by pushing into the unknown. To-day the time is ripe for a further advance; our President, with far-sighted patriotism, has arisen to lead effort and action. He deserves, and I am sure will receive, your earnest support and that of all citizens who understand the importance of the problems involved.

The authoritative remarks of the great ironmaster elicited prolonged applause at frequent intervals, and when the twenty-minute limitation prevented the completion of his address unanimous consent to an extension of time was instantly given.

Following the address of Mr. Carnegie, Dr. I. C. White, State Geologist of West Virginia, discussed "The Waste of Our Fuel Resources," his paper being given here in full:

A great geologist once said, "The nations that have coal and iron will rule the world." Bountiful nature has dowered the American people with a heritage of both coal and iron richer by far than that of any other political division of the earth.

It was formerly supposed that China would prove the great store-house from which the other nations could draw their supplies of carbon when their own had become exhausted, but the recent studies of a brilliant American geologist in that far-off land, rendered possible by the generosity of the world's greatest philanthropist, tell a different story. The fuel resources of China, great as they undoubtedly are, have been largely over-estimated, and Mr. Willis reports that they will practically all be required by China herself, and that the other nations cannot look to her for this all important element in modern industrial life.

A simple glance at a geological map of the United States, will convince any one that nature has been most lavish to us in fuel resources, for we find a series of great coal deposits extending in well scattered fields almost from the Atlantic to the Pacific, and from the Lakes to the Gulf, while even over much of New England and the coastal plains, vast areas of peat, the primal stage of coal, have been distributed. But coal of every variety from peat to anthracite is not all of nature's fuel gifts to fortunate America. Great deposits of both petroleum and natural gas occur in nearly

every state where coal exists, and in some that have no coal. What greater dowry of fuels could we ask when we find them stored for us within the bosom of our mother earth in all three of the great types, coal, petroleum and natural gas, only awaiting the tap of the pick and drill to bring them forth in prodigal abundance?

What account can we as a Nation give of our stewardship of such vast fuel treasures? Have we carefully conserved them, using only what was necessary in our domestic and industrial life, and transmitting the remainder, like prudent husbandmen, unimpaired to succeeding generations? Or have we greatly depleted this priceless heritage of power, and comfort, and source of world-wide influence, by criminal waste and wanton destruction? The answer should bring a blush of shame to every patriotic American, for not content with destroying our magnificent forests, the only fuel and supply of carbon known to our fore-fathers, we are with ruthless hands and regardless of the future applying both torch and dynamite to the vastly greater resources of this precious carbon which provident nature had stored for our use in the buried forests of the distant past. The wildest anarchists determined to destroy and overturn the foundations of government could not act in a more irrational and thoughtless manner than have our people in permitting such fearful destruction of the very sources of our power and greatness. Let me enumerate some of the details of this awful waste of our fuel resources that has been going on with ever increasing speed for the last 40 years.

First let us consider how we have wasted natural gas, the purest form of fuel, ideal in every respect, self-transporting, only awaiting the turning of a key to deliver to our homes and factories, heat and light and power. Partial nature has apparently denied this great boom to many other lands. It is practically unknown in France, Germany and Great Britain, our chief competitors in the world of industry. Even wood and coal must first be converted into gas before they will burn, but here is a fuel of which nature has given us a practical monopoly, lavish in abundance, already transmuted into the gaseous stage and stored under vast pressure to be released wherever wanted at our bidding. The record of waste of this our best and purest fuel is a national disgrace.

At this very minute this unrivaled fuel is passing into the air within our domain from uncontrolled gas wells, from oil wells, from giant flambeaus, from leaking pipe lines and the many other methods of waste at the rate of not less than one billion cubic feet daily and probably much more.

Very few appear to realize either the great importance of this hydro-carbon fuel resource of our country, or its vast original quantity. Some of the individual wells, if we may credit the measurements, have pro-

duced this fuel at the rate of 70 million cubic feet daily, the equivalent in heating value of 70,000 bushels of coal, or nearly 12,000 barrels of oil. In my humble opinion the original amount of this volatile fuel in the United States, permeating as it does every undisturbed geologic formation from the oldest to the most recent, rivaled or even exceeded in heating value, all of our wondrous stores of coal.

Suppose that it were possible for some Nero, inspired by a mania of incendiarism, to apply a consuming torch to every bed of coal that crops to the surface from the Atlantic to the Pacific, and that the entire coal supply of the Union was threatened with destruction within a very few years, what do you think would happen? Would our State Legislatures sit undisturbed unperturbed by such a carnival of fire? Would the Governors of 30 States remain silent while the demon of flame was ravaging the coal resources of the Republic? Certainly not; there would be a united effort by the Governors and Legislatures of all the States in the Union to stay the progress of such a direful conflagration; even the sacred Constitutional barriers wisely erected between State and Federal authority would melt away in the presence of such an awful calamity, and the mighty arm of the Nation would be invoked to help end the common peril to every interest. And yet this imaginary case is an *actual one* with the best and purest fuel of the country, equal probably in quantity and value for heat, light and power to all of our coal resources. This blazing zone of destruction extends in a broad band from the Lakes to the Gulf, and westward to the Pacific, embracing in its flaming pathway the most precious fuel possessions of a continent. No one can even approximate the extent of this waste. From personal knowledge of conditions which exist in every oil and gas field, I am sure the quantity will amount to not less than one billion cubic feet daily, and it may be much more. The heating value of a billion cubic feet of natural gas is roughly equivalent to that of one million bushels of coal. What an appalling record to transmit to posterity!

From one well in eastern Kentucky there poured a stream of gas for a period of 20 years without any attempt to shut it in or utilize it, the output of which, it has been figured, was worth at current prices more than three million dollars. Practically the same conditions characterized the first 25 years of Pennsylvania's oil and gas history, and the quantity of wasted gas from thousands of oil and gas wells in western Pennsylvania is beyond computation. In my own state of West Virginia, only eight years ago, not less than 500 million cubic feet of this precious gas was daily escaping into the air from two counties alone, practically all of which was easily preventable, by a moderate expenditure for additional casing. When it is remembered that one thousand cubic feet of natural gas weighs

48 pounds, and that 6,000 cubic feet of it would yield a 42-gallon barrel of oil when condensed, so that a well flowing 6,000,000 feet of gas is pouring into the air daily the equivalent of 1,000 barrels of oil, what would our petroleum kings think, if they could see this river of oil (for the equivalent of a billion feet of gas is more than 160,000 barrels of petroleum, and of practically the same chemical composition as benzine, or gasoline) rushing unhindered to the sea? Would they not spend millions to check such a frightful waste of this golden fluid? And would they not be the first to appeal to the national government for aid in ending such great destruction of property? And yet because natural gas is invisible, and its waste is not so apparent to the eye as a stream of oil, or a burning coal mine, the agents of these oil magnates have not only permitted this destruction of the nation's fuel resources to continue, but they have prevented by every means in their power the enactment of any legislation to stop this frightful loss of the best and purest fuel that nature has given to man.

There can be no doubt that for every barrel of oil taken from the earth there have been wasted more than ten times its equivalent in either heating power, or weight even, of this the best of all the fuels, and also that much more than half of this frightful waste could have been avoided by proper care in oil production and slight additional expenditures.

In justice to the great oil-producing corporations, it must be acknowledged that they have not permitted much waste of petroleum except what has been sprayed into the air by their awful waste of gas, and also that their handling of petroleum has been from the beginning a model of business economy and management. The great mistake of the oil producing interests has been in not properly apprehending the enormous fuel value of the natural gas they were destroying, and in not demanding legislation for its protection instead of successfully throttling and preventing it in every state of the Union except one—Indiana. When the people of that great state awoke to the fact that their richest mineral possession was being rapidly wasted, they rose to the occasion, and although it was largely a case of "locking the stable door after the horse had been stolen," they effectually prevented any further useless waste of natural gas. This Indiana statute which has been declared constitutional by our highest courts, says in effect to the oil producers—"You cannot take the oil from the ground where nature has safely stored it, until you provide a method of utilizing the accompanying gas, or volatile oil as well," and it also says to both the producer and consumer of natural gas, that it is against "public policy to waste this valuable fuel and that it will not be permitted to either party." This Indiana statute for the conservation of petroleum and natural gas should be enacted into law in every

state where this precious fuel exists; and why has it not been done? Let the answer be found in the history of my state, where the waste of natural gas has been exceeded only by that of our sister state of Pennsylvania.

For ten years your speaker has appealed in his official capacity as State Geologist to the Legislature of West Virginia to put some check upon this frightful waste of our State's most valuable resource. Three patriotic Governors, including our present able executive, Governor Dawson, have in every biennial message besought the Legislative branch to end this criminal destruction by appropriate legislation, but some unseen power greater than Governors or Legislatures has so far thwarted and palsied every effort to save the state and the Nation this priceless heritage of fuel, so that although five successive Legislatures have attempted to deal with the question in biennial sessions not an effective line has yet been added to the statutes, and at this very hour not less than 250 million cubic feet of gas, and possibly more than double that quantity, is daily being wasted in this one state alone, 80 per cent of which is easily and cheaply preventable.

Why should a few oil producers in their insane haste to get rich quickly, or add to fortunes already swollen beyond safety to the Republic be permitted thus to despoil the entire country of its choicest fuel?

But surely if men have thus permitted the loss of our gaseous fuels, often because they could neither see the substance itself nor realize the extent of what they were doing, certainly they would not be so wasteful of the solid fuels, the coal beds, something they can readily perceive and handle and weigh. The record here is also one to make every citizen of our Nation feel distressed and humiliated, for of the total quantity of coal we have produced since mining for commercial purposes began, amounting to about five billion tons, at least an equal amount and possibly more, has been left in abandoned mines, and irretrievably lost. You who are unacquainted with the details of mining operations, and of the structure of coal beds, will doubtless wonder how such a vast loss of fuel could take place. There are many causes for the existence of this enormous waste in the extraction of coal. Let me enumerate a few of them.

First: The individual coal bed is not all pure coal and this is especially true if it be very thick. Some of it consists of layers of sulphurous or bony coal, rich in carbon, it is true, but containing more ash, sulphur, or earthy material than first-class coal should hold; hence the purchaser objects, and refuses his patronage to the party who sends him coal that is high in ash. There being no market for such coals, the operator leaves this kind of fuel unmined if it be in either the roof or bottom of his coal bed, and if it be interstratified with the pure coal, as it frequently is, he simply

throws it along with other mine refuse into the gob heaps within the mine, or piles it in the hillocks of culm containing shale, clay, and other waste material at the entrance.

The quantity of this impure coal varies from 10 to 50 per cent in nearly every coal bed, and it would possibly average 25 per cent in all the mines of the country. This material is rich in carbon, both fixed and volatile, and when utilized through the agency of producer gas, and the gas engine, will yield much more power than the same weight of the best Cardiff or Pocahontas coal when the steam engine is the agency of conversion. Why should our great manufacturing companies permit one-fourth of our entire coal resources to be thus wasted and permanently lost, when the researches of the Technical Branch of the United States Geological Survey have fully demonstrated the practicability of converting these impure coals into great sources of power? If in all new installations provision were made for the use of gas engines, a large portion of these impure coals could be utilized, and our purer types of fuel preserved for other purposes.

Second: In the mining of coal it is necessary to support the overlying strata over large areas of the mine in order that the coal may be even partially taken out, and hence it is the common mining practice temporarily to utilize about 50 per cent of the solid coal itself, in the shape of supporting pillars for the protection of roadways, air courses, working rooms, etc. On account of accidents, like falling roof rock, "squeezes," "creeps," "crushes," mistakes in mine engineering, bad roof, and other causes, many of these huge pillars are frequently submerged and surrounded with broken rock material, and thus another large portion of every coal bed, the quantity varying from 10 to 50 per cent, is utterly lost, so that approximately 25 per cent more of the nation's coal resources is wasted from these, largely preventable causes.

With 50 per cent of our coal left in the abandoned mines, from which it can never be recovered, except at enormous expense, one would think that the end had come to wanton destruction of our coal resources, but not so.

A third means and one of unknown extent has yet to be considered. Some of the impure layers of coal may have a still larger percentage of earthy matter, and then they become partings of shale, the fossil muds and soils borne into and spread over the ancient peat bogs by the draining streams of geologic time. These partings vary in thickness from a few inches to several feet. When thin, and not exceeding 6 to 12 inches, the usual mining practice is to take them out and secure the coal, but where they attain a thickness of 18 to 24 inches their removal entails too much expense for the production of bituminous coal under present commercial conditions, and hence the parting is not removed and

the underlying or overlying coal, as the case may be, is left in the mine, usually in such a condition as to be practicably irrecoverable. These parting shales often occur near the middle of the coal seam, and thus one-half of the bed will remain buried in mine rubbish, with no possibility of ever securing its precious fuel. Very much akin to this is another kind of waste about which we as yet cannot even approximate the extent. It is well known that in very rich coal fields several (3 to 10) beds may overlie each other in the same mountain, separated by from five to 200 feet of rock material. It often happens that the thickest and best of the beds may underlie all the others, and hence will be the first one mined, regardless of the fact that when the overlying strata break down, some and possibly several of the higher coal beds will be so dislocated and disturbed and their areas so permeated with deadly gases from the abandoned mines below that much of this higher coal will be lost. Just how much no one yet knows, but it is feared that the fuel waste from this source will prove large. Of course nearly all this loss could be prevented by mining the higher beds first. Another deadly peril to deep coal mining is an incident of oil and gas production. Many thousands of holes have been drilled through the coal measures to reach the productive oil and gas zones below. Very many of them have found only natural gas, and unless the well was very large or a profitable market near at hand, the casing has been drawn and the well abandoned. It is greatly feared that, in such cases, another great menace will be added to the coal mining industry, since these abandoned oil and gas wells, which penetrate the coal measures, are numbered by the thousand, and no accurate public charts of the same have ever been kept.

The same story of waste of fuel comes from every mining center. The experts of the United States Geological Survey report the quantity of fuel left unmined in the ground all the way from 40 to 70 per cent of the total deposits. I shall not worry you with details from all over the country, but shall illustrate the rapid exhaustion of our fields by special reference to one great district with which many of you are personally familiar.

The mining of bituminous coal, and the manufacturing industries dependent thereon, originated at Pittsburgh only about a century ago, and her citizens, as well as all others, may learn a useful lesson by recalling the history of this beginning. The earliest settlers found there cropping high in the steep hills which border the Monongahela River a thick bed of splendid coal. As roadways could not be constructed to the inaccessible cliffs where the coal was first discovered, some other method of securing it was necessary.

At that time the American bison, or buffalo, roamed the vast plains of the middle West in countless millions, and these ani-

mals were so abundant even in the Pittsburgh region that their skins were used for conveying the coal from the mines to the factories in the deep valley below, a few bushels of coal being sewed up in each hide and then rolled down the steep slopes. To our forefathers the supply of buffalo appeared "inexhaustible," and yet less than a century of wanton slaughter has practically exterminated this noble animal. This passing of the buffalo illustrates in a striking way what will just as surely happen to vast areas of our fuel resources, great as they are, even within the limits of the present century, unless our people awaken to what they are doing and make a determined effort to stop their destruction. The people generally have been so often told of their "inexhaustible" supplies of fuel that its waste has not impressed them as a problem worthy of serious thought. They have generally believed that its exhaustion was so remote that its consideration even concerned the present only in an academic way. Let us see about that. We shall take for our illustration the Appalachian coal field, which is conceded by all to be the richest in fuel of any on the continent. It is also the most important to the welfare of the country, since it is nearest the seaboard and contains the vast bulk of our good coking coals upon which our pre-eminence in the iron and steel industry depends. With the exception of a few narrow strips close to regions of rock disturbance or folding in our Western country, no first-class coking coals have yet been discovered in the United States outside of this Appalachian Basin.

It has long been recognized by all that the Pittsburgh district is located in the heart of the Appalachian field, where fuel of every description is most abundant and most accessible. You will pardon a personal reminiscence which illustrates how an eminent political economist regarded this favored region. It was my good fortune to accompany the lamented Blaine, one of the greatest statesmen that America has ever produced, up the beautiful Monongahela River the last time that he visited his boyhood's home, 20 years ago. He had acquired 1,100 acres of Pittsburgh coal lands in the vicinity of Elizabeth, about 22 miles above Pittsburgh, and the party stopped there a few hours to permit Mr. Blaine to examine his property, which he termed his "savings bank," since he had acquired it by the occasional purchase of small farms during a period of several years. Being curious to know why he had made an investment of this kind, so far removed from his home in Maine, I asked him how it happened. His reply impressed me deeply because it contained a prophecy. He said that cheap fuel was the most important element in the life of nations, and that in looking the country over he had concluded that there was more of it easily accessible to the Pittsburgh region than in any other portion of the country, and hence the Pittsburgh district would sometime become the man-

ufacturing center of the world, and therefore that investments in its coal fields could not fail to prove remunerative. The prophecy of that far-seeing statesman was fulfilled much sooner than even he expected, since Pittsburg has certainly held first place among the workshops of the world for the last ten years. It is not generally known that the tonnage originating in the Pittsburg district and passing through it now exceeds that of the four greatest seaport cities of the world, London, New York, Liverpool, and Hamburg combined, so that not only Pennsylvania but every State in the Nation is interested in perpetuating as long as possible this empire of industry which our wonderful natural resources and the genius of the American people have conquered. How long can we hope to maintain this industrial supremacy in the iron and steel business of the world? Just so long as the Appalachian coal field shall continue to furnish cheap fuel and no longer. If the wasteful methods of the past are to continue; if the flames of 35,000 coke ovens are to continue to make the sky lurid within sight of the city of Pittsburg, consuming with frightful speed one-third of the power and half of the values locked up in her priceless supplies of coking coal, the present century will see the termination of this supremacy. Many of you may not credit this statement, so let us do some figuring on the matter as an aid in forecasting the future. All will admit that no portion of the Appalachian field is richer in fuel resources than the Pittsburg district, and if we can estimate approximately how long its fuel will last we will have gauged, in a rough way, the productive life of the Appalachian field.

The Pittsburg Coal Company owned on January 1, 1908, according to its recent annual report, 143,000 acres of the Pittsburg coal bed, or practically one-seventh of the entire acreage of this famous seam remaining yet unmined in Pennsylvania. During the year it exhausted 2,241 acres, obtaining therefrom for all purposes 18,000,000 tons of coal, or an average of 8,000 tons to the acre, leaving in the ground about 5,000 tons per acre of waste and unmined coal. Hence this average of 8,000 tons may be taken as a measure of the total amount of first-class fuel that will be won under present mining methods from each acre of Pittsburg coal yet remaining unmined in the Pittsburg district.

In 1906 Pennsylvania produced 109 million tons of bituminous coal, 84 millions of which came from the five counties of Allegheny, Fayette, Greene, Washington and Westmoreland, which hold practically all of Pennsylvania's Pittsburg coal area. In 1907 Pennsylvania produced 129 million tons of bituminous coal, and in the absence of exact statistics it is safe to say that at least 100 million tons of this product came from the five counties in question, and not less than 95 million tons of it from the Pittsburg seam.

There remains unmined in Pennsylvania only eleven hundred thousand acres of this great coal bed or a total available product of eighty-eight hundred million tons of coal, measured by the quantity (8,000 tons per acre), obtained by the best mining methods of a great corporation during 1907. Eighty-eight hundred million divided by 95 million yields a quotient of only 93 as the number of years this fuel in the Pittsburg seam will last if the present annual production should not be increased by a single ton. But who is there to say that it will not be doubled even within the next decade?

The West Virginia productive area of this great bed is only about the same as that of Pennsylvania, so that this contiguous region can add only a few years to the life of the Pittsburg coal production.

It may be replied that the Allegheny series of coals which underlie the Pittsburg bed may add greatly to the fuel resources of the Pittsburg district. This is an error, as the coals in the Allegheny and Conemaugh series appear to thin away and disappear as commercial propositions when they pass beneath the principal areas of the Pittsburg coal, while the active demand for coal at the seaboard will exhaust all of the productive areas of these lower and thinner coals with our present wasteful mining methods, even before the Pittsburg bed fails.

The productive coal area of the Appalachian basin has been greatly over-estimated in every one of the six great states through which it passes from Pennsylvania to Alabama. The drill of the seeker for petroleum and natural gas, while it has wasted untold millions of precious fuel, has taught one useful lesson, viz: that there is a wide area, 50 to 75 miles in breadth deep down in the center of the Appalachian basin, that is practically barren of commercial coal. This barren region begins with the lower measures just north from Pittsburg, and embracing large portions of the former supposed coal fields of both Ohio and West Virginia, passes southwestward into Kentucky, having a breadth of 25 miles where it enters that state.

To what extent the productive area of Kentucky, Tennessee, and Alabama will be affected by the southward extension of this barren belt, which has already cut the former estimates of Pennsylvania, Ohio, and West Virginia in half, we do not yet know, but certain it is that all the great coal formations, instead of holding productive coal entirely across this basin, as formerly supposed, are productive only as fringes 20 to 30 miles in breadth around the borders of the basin, while the great central trough is practically destitute of valuable coal. Hence, with only a reasonable estimate for increased coal production, if the present wasteful mining methods continue, there will be but little coal for manufacturing purposes within 100 miles of Pittsburg at

the opening of the next century, and practically no cheap fuel left in the entire Appalachian basin with which to maintain our supremacy in the iron and steel trade of the world.

The prospect is not a pleasing one to contemplate. That celebrated word picture of Lord Macaulay in which he describes a future traveler as standing on a broken arch of London bridge, in the midst of a vast solitude, sketching the ruins of St. Paul's, may find its substantial counterpart much nearer home than we could wish. True, the natural wealth of our beloved Union is so great and varied; our riches of soil, of forest, and stream are so vast, if preserved, and their boundless possibilities thoroughly utilized, that we would probably have the advantage of all other nations in the struggle for existence even after our fuel resources have been exhausted; but this is no reason why we should not do everything possible to conserve them so that we may retain, to a remote future, the great benefits which their possession assures.

Honorable Governors of the several states, the questions involved in this discussion are those in which you and your constituents are most vitally interested. Our patriotic President, ever watchful of the Nation's welfare, and of the people's interests, ever alert to guard against dangers from without, or the more insidious foes that would betray the people's liberties from within, has summoned you to a conference more important to the future of our great Republic than any council that has ever before met in the history of our country. Our honored President would protect this Nation not alone from perils on the ocean, but from the graver ones on land. The dangers that confront us on the Pacific as well as upon the Atlantic are serious and of far-reaching importance to the future of our country, and the people's President, under whose wise administration there is happily no North, no South, no East, no West; to whom in his official capacity the rights of all citizens, whether rich or poor, white or black, look alike, will be sustained by a united country in the request which he has made of Congress to provide "big sticks" in the shape of an adequate navy for both oceans as the surest and best guarantee of either peace or respect from the other nations of the earth. But the dangers that confront the great Republic from abroad are as nothing compared to the perils that lurk in the shadows at home. What will it profit this Nation to have won the wreath of industrial supremacy if in our thirst for gold and sudden riches we permit corporate greed, as well as individual avarice and selfishness, to waste and devastate the very sources of our prosperity? For just as sure as the sun shines, and the sum of two and two is four, unless this insane riot of destruction and waste of our fuel resources, which has characterized the past

century, shall be speedily ended, our industrial power and supremacy will, after a meteor-like existence, revert before the close of the present century to those nations that conserve and prize at their proper value their priceless treasures of carbon.

Whatever is possible in the shape of legislation for the protection of our fuel resources should be done by the individual states which you represent. Twenty-nine of the 46 states of the Union produce coal, and 24 of these produce more than a million tons annually, while practically the same number produce vast quantities of both petroleum and natural gas. The percentage of coal left in the ground beyond recovery, as we have seen, varies from 40 to 70 in the different fields, to say nothing of the wasteful and extravagant use of the portion extracted, while the waste of natural gas, the most precious fuel of all, is so vast that no one can even approximate the percentage. The task before you and your constituencies is indeed formidable. The forces of greed and selfishness are so entrenched behind corporate power and influence that to attack them may often appear to you as useless as the labors of Sisyphus. But as you love your states and country, I adjure you to take up this fight for the conservation of our fuel resources, with the determination never to surrender until the forces of greed and avarice, which are so rapidly sapping the very foundations of our country's greatness, capitulate and agree to end the wild riot of destruction that has characterized the past.

Mr. President, I greatly regret that the part assigned me in this discussion has led along such unpleasant lines. The story of the awful waste of our most valuable natural resources is one of such a disgraceful character that its exposition to the world is necessarily mortifying to all patriotic Americans; but a sense of duty to our common country compels that the truth be told, however humiliating to our national pride.

This conference will not have met in vain if it shall result in awakening public sentiment to the peril which overshadows the Republic in this uncontrolled waste and dissipation of our fuel resources. These eminent Governors, whom you have summoned to hear this narrative of rapine and devastation, to many of whom the story is new and almost unbelievable, owe you a debt of gratitude which they can only adequately repay by arousing the citizens in their respective states to such a realization of the gravity of the dangers which follow in the wake of unbridled waste that whatever is possible for legislation may be speedily enacted into law. Forewarned is forearmed, and this conference, which has brought together so many influential citizens from every state in the Union, should not fail to be productive of untold good to the Nation's future.

General discussion of Mr. White's paper was opened by Mr. John Mitchell, for years, and until last January, president of the United Mine Workers of America. Mr. Mitchell has long been known as an eloquent and forcible speaker and writer upon matters connected with coal, mining operations, and mineral fuel supplies, and his brief paper was the statement of a man who has during his life been in actual, close touch with all sides of this most important question.

Mr. Mitchell took issue with those experts who state that one-half the coal of our mines is lost through wasteful or unscientific mining operations. He stated, however, that his personal observation led him to believe that fully twenty-five per cent of the coal was so wasted beyond recovery—through difficult physical characteristics of some of the formations, through pillaring the workings with solid coal for the support of the roofs of tunnels and other workings, through cave-ins, and through the shunning of veins of low-grade coal. Mines operated under any of these faulty conditions, he stated, were, when worked out, left to cave in, and thus the coal remaining in them was permanently lost.

He stated that large coal consuming corporations in America pay about a dollar a ton, at the mines, for their coal supplies, while like corporations in other countries are forced to pay from \$2 to \$3 per ton for their fuel supplies. He said that, while it is vitally important to our industrial well being that large manufacturing concerns be furnished their coal supply at a cost sufficiently low to enable them to compete with manufacturers in other countries, still, in view of the tremendous waste of energy that accompanies the use of cheap fuel, the conclusion is inevitable that this very cheapness is as extravagance, and not an economy. Illustrating this point, he stated that the cheapness of fuel led to improper firing and the use of imperfect furnaces, the result being that three tons of coal are consumed

in creating the power that under proper conditions would be generated by a single ton.

Touching on the shocking loss of life that accompanies coal mining operations in the United States, Mr. Mitchell stated that for every 100,000 tons of coal produced in this country one mine worker is killed and several are injured. Last year, he said, 2,500 coal miners were killed and more than 6,000 were seriously injured in the coal mines of the United States; and he stated that in the foreign countries, where mining is most hazardous, the proportion of those killed to those employed in the mines is from fifty to seventy-five per cent less than in the United States. In conclusion Mr. Mitchell said:

"In our mad rush for spoils and profits we not only waste and destroy those material resources with which God has so bountifully endowed us, but we press forward in the race, sacrificing, unnecessarily, the lives and the comfort of our fellow beings. It seems to me that the time has come when we should stop for a moment and think—not alone of those inanimate things that make for comfort and prosperity, but also of the men, and the women, and the children, whose toil and deprivation have made and will continue to make our country and our people the most progressive and the most intelligent of all the nations and of all the peoples of the earth."

At the conclusion of Mr. Mitchell's talk, Governor John A. Johnson, of Minnesota, who had arisen to make a motion, was urged to the platform, and his extemporaneous talk was listened to with deep interest, outbursts of vigorous applause punctuating his speech at frequent intervals.

Governor Johnson announced that his real purpose in arising was to ask the Conference to listen to Dr. Charles R. Van Hise; but the Conference was not minded to let the Minnesotan off without a speech after he had arisen. Governor Johnson said:

"I have been very seriously impressed in the few hours during which we have been together. It seems to me that if all that has been said is fact, and I assume it to be fact, that the sun of American prosperity has reached the zenith, and that the shad-

ows are beginning to find their places on the other side of the hill. When I realize that this is going to make no particular difference to us of this generation, the great patriotic duty devolves upon us, and upon the people of the country as a whole, to do that which is going to work out some solution of the various problems for the future, whether it be one hundred or two hundred years hence."

Referring to Mr. Carnegie's statement in regard to the approaching exhaustion of iron ore beds, Governor Johnson said:

"I am rather inclined to contradict some of the statements that have been made, if I might be permitted to do so. I am rather a stranger in the realm of iron to contradict any opinion Mr. Carnegie may have. Certainly he ought to know as much on this subject as any other man in the country, except, possibly, Mr. Hill, who I am sure will be glad to take issue with him on certain things. * * * I think some eight or ten years ago Mr. Schwab, who was connected with all of the companies in which Mr. Carnegie was interested, said on the stand that there was something like a billion tons of ore in the Mesaba region. Mr. Carnegie says it is a billion and a half tons. I am sure that if there has been a growth of half a billion tons in eight or ten years, there is little necessity for conservation of that natural resource." (Laughter and applause.)

"In the long run the problem with us is going to be—is even now—an engineering problem. If you will notice on the map, the Father of Waters, the Mississippi, runs almost to the very outer western edge of Lake Superior. The Government has paid out sixty-odd millions of dollars to improve Superior, Huron and the other Great Lakes. I think less than seventy millions of dollars have been invested there, and with this expenditure the Government's engineers have made out of the lake system the greatest commercial waterway in the world. There is nothing like it. Now, if seventy millions of dollars will make out of the lakes such a commercial waterway, what would a few millions, intelligently used, amount to if Lake Michigan, from its southern extremity, were canalized into the Mississippi; if Lake Superior were canalized into the upper portion of the Mississippi, and if the Mississippi were improved? We would be given such a power of distribution as we have never had, and with us this is, after all, the great problem. It seems there are two problems here—not only the conservation of our natural resources, but the development of our industries—and one is just as important as the other. I do not believe the American people want to lock up the iron mines; I do not think they want to lock up the industries of the Middle West or of the country. I believe that what they want is the true, scientific development of all of these resources and indus-

tries; and with such development the future will come pretty near taking care of itself."

Governor Johnson then asked the Conference to listen to Dr. Van Hise, president of the National Association of Universities, and for many years connected with the United States Geological Survey. Dr. Van Hise said:

According to Dr. C. K. Leith the known iron ore resources of the Lake Superior region are about 1,900,000,000 long tons, bearing fifty per cent or more metallic iron. According to Dr. E. C. Eckel the known iron ore reserves of the Southern Appalachians are 2,500,000,000 long tons, bearing thirty-three per cent to fifty per cent metallic iron. Taking into account the difference in metallic content, the amount of iron in the known high grade ores is about the same in each of the two regions. While these two regions contain the great known reserves of iron ore in the United States, the known reserves of the central and eastern states are not unimportant. Also the known reserves of the western states are large, although not to be compared with those of the Lake Superior region or the South.

While the amount of iron ore which has been mined in the United States has been rapidly decreasing during the past twenty-five years, rising from 8,400,000 long tons in 1883 to 48,907,900 long tons for 1907, the discovery of new deposits has gone on at even a more rapid rate, so that it is certain that for the Lake Superior and the Southern Appalachian regions, together as well as separately, more iron ore is now known to exist than at any previous time in the history of the country.

If the grade of what is called iron ore for the Lake Superior region should be dropped from fifty per cent to forty per cent—and some material is already mined which runs between these figures—the amount of reserves would be enormously increased. But no quantitative statement can be made at the present time in reference to additions which would be thus available.

Also, in the Southern Appalachians, Eckel estimates that the probable amount of iron ore which will become known in the future by deep mining—that is, below the thousand foot level—especially if the percentage of metallic iron be somewhat lowered, will greatly exceed the present known reserves. Indeed, he suggests that future development along this line may amount to three times as much as the present estimated reserves, or 7,500,000,000 tons. This forecast may be too sanguine, and is admittedly more or less conjectural. However, it can hardly be doubted that the quantity of iron ore to become known in the future in the south is enormous.

In considering the material available to the United States we should take account of the supplies in adjacent countries. Mexico is as yet very imperfectly explored. In Canada there are vast areas of wholly unexplored territory. In Cuba, examinations made by Spencer show that the known reserves of iron ore of fair metallic content are very large, and some of the more extensive of these deposits are already controlled by United States capital. Of the South American iron ore resources we are as yet very imperfectly informed.

While the additions to the known reserves of iron ore available to the United States, which are to be made by discoveries in the western United States, in Canada, in Mexico, in Cuba, and in South America, are uncertain, it is hardly possible that the amount will not be very important; but as yet there is no reason to suppose that discoveries in any of these countries, with the possible exception of Cuba, will reveal iron ore deposits comparable in importance to the Lake Superior and the Southern Appalachian districts.

From the foregoing facts it appears probable that for some years to come iron ore available in the United States will continue to be discovered more rapidly than it is exploited, and consequently the total known reserves will increase rather than decrease. Hence the crest for known iron ore reserves of high grade may therefore be some years in the future.

While, therefore, it is safe to say that the available high grade iron ore will be adequate for possibly a century, even if the rate of production further greatly increases, it is to be remembered that as the percentage of iron ore goes down a larger amount of coal is required to obtain a ton of metallic iron, and, therefore, in proportion as our rich ores are exhausted, the draft will become steadily heavier upon the most important of the underground resources—fuel.

Turning now to another metal, copper, so far as I know there has been no systematic attempt to estimate the copper reserves, but it is safe to say that the known reserves of high grade copper are at the present time very much less than they were some years ago. It is true that the copper product of the United States, as well as that of the world, has steadily increased for many years until 1906, when maxima of 410,000 long tons for the United States and 705,000 long tons for the world were reached. The year 1907 shows a falling off from these figures of between 9,000 and 10,000 tons for the United States and between 7,000 and 8,000 for the world. Whether this check is temporary is uncertain, but it suggests that if we have not already reached the crest of production for copper we are nearing it. Indeed the rapid annual increase in the output of copper for the past dozen years has only been accomplished by the exploitation

of increasingly lower grade ores. At the present time it is clear that the crest of known reserves of high grade copper ore has been passed. However, as in the case of iron, the extent of the low grade materials is very imperfectly known, and in the future for a time the output may remain as great as in the past, provided sufficiently low grade ores be worked. But with reference to copper, as with reference to iron, it is to be remembered that the lower the grade of ore the more it costs to produce a pound of metal, and therefore that, as the grade of the ore decreases, the price of the copper must rise. Those who are familiar with the situation know that in any of the great camps, upon the average, it costs more to make a pound of copper than it did a few years ago.

For lead and zinc, gold and silver, it is not possible to make statements even as definite as those concerning copper. These metals are usually developed in the mines only to a limited degree in advance of their exploitation. Therefore there never have been at any one time in many years reserves of the ores of lead and zinc, of gold and silver in sight. There are no great known reserves for those metals in the sense that reserves are known for iron ore. However, exploration and exploitation have gone on together with the result that there has been a steadily increasing output of these metals both for the United States and for the world. Indeed the increase for the last twenty-five years has been remarkable. The percentages of increase for 1907, as compared with 1883, twenty-five years previously, are as follows:

For lead, 150 per cent; for zinc, 537 per cent; for gold, 62.9 per cent; for silver, 21.8 per cent.

Apparently the maximum output for none of these metals has been reached, with the exception of silver, which with the United States has been nearly horizontal for about fifteen years, and for the world has somewhat declined for the last half dozen years, as compared with the previous period of the same length. How long we may expect an increase in the output of lead, zinc and gold is uncertain, but, as in the case of copper, it may be said that the maintaining of an increasing output for the United States and for the world has only been possible by utilization of lower grade ores.

It is a very conservative statement to make that during the last half century from the earth there have been taken more of our metallic wealth than during all the previous history of its exploitation. For some of the metals we may illustrate the marvelous increase since 1850:

From 1810 to 1853 the amount of iron ore exploited in the United States is estimated at 4,500,000 long tons; from 1854 to 1907, more than 640,000,000 long tons. The pig iron product of the world from 1500 to

1850, 350 years, is estimated at about 125,000,000 metric tons; from 1850 to 1906, 56 years, at 1,113,000,000 metric tons, or about nine times as great.

In the case of copper the amount which was taken out before 1850 in the United States is inconsiderable, but in 1906 it reached fifty-eight per cent of the world's production. For the first half of the nineteenth century the copper production of the world was 831,400 long tons, and for the second half 8,675,899 long tons, or more than ten times as much.

The gold production of the world from 1493 to 1850, 358 years, is estimated at 152,779,050 fine ounces, and from 1851 to 1907 at 405,075,135 ounces, or about three times as much.

The increase in the amount of silver mined was not so great as for gold. The estimated silver product from 1493 to 1850, 358 years, is 4,816,939,012 fine ounces, and from 1851 to 1907, 58 years, 5,166,804,675 fine ounces.

The above figures illustrate the point that the exploitation of the base metals, iron, copper, lead, and zinc, was relatively unimportant until the middle of the last century, whereas in the case of the noble metals the amounts exploited before 1850 were important. So far as the progress of the world is concerned, there is no question that the base metals are of immeasurably greater consequence than the noble metals.

Statements similar to those concerning the base metals may be made even more emphatically in reference to coal. Illustrative of this in the United States, the coal production of the year 1856 was 12,293,000 metric tons, whereas for 1907 it was about 492,000,000 metric tons, or more than thirty-three times as great. Similar, although perhaps not so striking, figures might be given for other countries; so that it is safe to say that the amount of coal exploited in the last half century for the world is several times as great as the amount mined during all previous time.

The above statistics show that during the last half century our metallic resources and coal have been drawn upon at a rate which has never before been dreamed of. This revolution has been largely due to the rise of applied science and its application to machinery and transportation. If instead of the last half century the last quarter century only were considered, the enormous drafts upon our metallic resources would seem even more startling. During this period the total value of the annual metallic product of the United States has increased from about \$447,000,000 to over \$2,000,000,000 or more than four times.

Since the great acceleration in the exploitation of our metallic resources has occurred so recently, the yardstick with which we are to project into the future is very short. We do not know whether the acceleration of exploitation of the past

few years will be continued at the same rate, but it seems rather probable that the time is near at hand when the speed of acceleration will lessen. But whatever we may conclude in reference to this matter, we cannot doubt that for many years to come the amount of metals extracted for any one decade will exceed that of the previous decade—that is, that the acceleration will proceed at some rate. Also it has been seen that while an approximate estimate can be made of the reserves which are yet to be developed or discovered in unexplored territory. Hence it is impossible to make any definite forecasts as to the time when the ores of any given metal will be exhausted.

Upon the whole, the foregoing very brief review of the situation does not warrant such extremely pessimistic views as have sometimes been stated in reference to our reserves of iron, lead, copper, zinc, gold, and silver. It is rather probable that we of this generation shall not see any great shortage of these metals. The same may be true for the next generation; but even the most sanguine calculation cannot hold out the hope that the available high grade ores of iron, copper, lead, zinc, gold, and silver, at the present rate of exploitation, will last for centuries into the future. And what are one or two centuries compared with the expected future life of the Nation?

But it may be said that when the metallic ores are mined and reduced the metals are but put into a more available form. In short, that they are capitalized. This is true in large measure for all the metals. It may be very well illustrated by the world supply of gold, now in the treasuries of the banks and circulation among the people, estimated at about \$7,000,000,000. However, it is plain that with the baser metals, lead, zinc, copper, and iron, we are very careless in preserving the existing accumulations. These materials are so handled that the yearly losses are very great. By care and economy the losses could be immensely reduced and thus our capital of metals kept in a relatively unimpaired condition.

Certain it is that it took the building of the world, involving concentration and re-concentration of the metals, to produce the ore deposits. The process of their formation is so slow that so far as we are concerned it may be ignored. We and our descendants are in the position of a man who has in the bank a definite amount of money upon which he may draw during his lifetime. He may be more or less ignorant of the amount which is available in the bank, as we are ignorant of the amount of metallic ores available in the bank of the earth. It is therefore plainly our duty in exploiting the metal ores to do this in such a fashion that the reserves of lower grade products not now available because of market conditions may in the future be exploited. Also it is plainly our duty to use met-

als which have been mined and reduced in such a way that the yearly loss shall be as small as possible. In short, we should keep the capital as nearly unimpaired as practicable. These two duties are plainly before this generation. If they are disregarded our descendants will charge us with wanton extravagance. We shall be in the position of a father who has wasted his patrimony and left a diminished estate to his son.

Following a brief discussion in regard to points of procedure, during which the suggestion was made that Governor Burke, of South Dakota, be made honorary secretary of the Conference, Mr. John Hays Hammond, the celebrated mining engineer, who has the distinction of being the highest salaried private individual in the world, addressed the Conference on the ore and mineral deposits of the country. Mr. Hammond said:

"What has been said of the danger of the rapid depletion of the iron and coal deposits, is applicable, *mutatis mutandis*, to the other mineral deposits of the country.

"In common with every other national industry, that of mining is vitally concerned in the conservation of our natural resources. These discussions show conclusively the interdependence of our national industries. The exploitation of our mines depends, chiefly, upon the costs of labor, power, and supplies; and these costs are determined by the economies attending the development of our other natural resources. Thus, the cost of mining-labor is dependent upon the expenses of living; the cost of power, upon the cost of fuel or the cost of power hydro-electrically generated; and lastly, the cost of supplies depends upon the cost of their production. Therefore, upon the economies effected in the other national industries, depends, reciprocally, the cost of our mineral products. Now, obviously, the lower the cost of mining, the greater the available tonnage of products that can be profitably mined. Indeed, in many of our low grade mines, so-called, the margin between profit and loss is so small that any appreciable increase in the cost of mining involves pecuniary loss and, consequently, the cessation of operations. Furthermore—and this is important—the mines of this character are those from which the major part of our production is derived.

"It has, unfortunately, been the popular custom to refer to large deposits of ore as illimitable and inexhaustible. Such hyperbole characterizes the description of the famous gold deposits of the Transvaal. As a matter of fact, we mining engineers know that these exceptionally extensive deposits will practically be exhausted within a cou-

ple of decades—certainly within a generation. The ever-increasing rapidity of exploitation, consequent upon the exigencies of modern engineering and economic practice, inevitably tends to an alarming diminution of the lives—if I may use that term—of our mineral deposits. The culmination of our mining industry is to be reckoned in decades, and its declension, (if not practically its economic exhaustion) in generations, not in centuries. While it is undoubtedly the fact that a very considerable lowering of the working cost, or a correspondingly greatly enhanced value of the mineral products, would prolong the activity of the mining industry, yet the statement I have made, predicated as it is upon the known mineral deposits, may be regarded as conservative. Explorations will undoubtedly lead to the finding of new mining fields, but the discovery of the more important deposits will, in all probability, occur in the comparatively near future.

"There is no way of revolutionizing our mining methods to attain better results; but they are susceptible, it is true, of greater improvements, and especially so in the metallurgical processes. But even therein the irreducible minimum is not great, compared with the advantage that would result to the mining industry from the conservation of the natural resources of the country.

"In striving, as we engineers are doing, to prevent, as it were, the leakage of water through the bung-hole, we see a large volume flowing out through the broken staves at the other end of the barrel. It is for this reason that you may rely upon the hearty co-operation of the miners of our country in your efforts to conserve the Nation's natural resources, and to perpetuate our national supremacy."

Answering calls from every part of the floor, Honorable Elihu Root, Secretary of State, extemporaneously addressed the Conference. Secretary Root said in part:

"Forty-four sovereign States are represented here, I see by the newspapers; all sovereigns here upon the invitation of the Executive of the sovereign Nation, the United States. No one can over-estimate the importance of maintaining each and every one of the sovereignties of the states (applause), and no one can overestimate the importance of maintaining the sovereignty of the Nation.

"The Nation cannot perform functions of the state sovereignties. If it were to undertake to perform those functions it would break down. The machinery would not be able to perform the duty. The pressure is already very heavy upon the national machinery.

"I feel deeply impressed, however, with

the idea that the forty-six sovereign states, in the performance of their duties of government, are lagging behind the stage of development which the other sovereignties of the earth have reached. As the population of our states increases; as the relations between the people of each state and other states grow more frequent, more complicated, more important, more intricate, what every state does is most important to the people of every other state. (Applause.)

"If you look at the international life of the world you will see that the correspondence between the nations is continually increasing; in the letter-writing sense, but in the intercommunication and understanding of things that they should do in concert for the benefit of all their people.

"Scores and hundreds of conferences and congresses are being held under government auspices to regulate the action of the different nations of the earth. England and France and Germany and Spain, and all the nations of Europe, are considering the conduct of their governments with reference to the effect which their action shall have upon the people of each other government.

"Now, the states, in the exercise of their sovereignty, in the exercise of the powers reserved to them, rest under the same kind of duty (applause), a duty that forbids the people of any state to live unto itself alone. (Applause.)

"The Constitution of the United States prohibits the states from making any agreement with each other without the consent of Congress; but you can make any number of agreements with the consent of Congress. Why should not the powers that are reserved to the state sovereignties be exercised by those sovereignties, with a wise regard for the common interest, upon conference, upon complete understanding of the duties of good neighborhood, under a firm resolve to make it wholly unnecessary that this continual pressure to force the National Government into the performance of the duties that the states ought to perform should continue? (Applause.)

"I regard this meeting as marking a new departure, the beginning of an era in which

the states of the Union will exercise their reserve sovereign powers upon a higher plane of patriotism and love of country than has ever existed before." (Great applause.)

Secretary Root was followed by Secretary of the Treasury George B. Cortelyou, who made a few happy remarks along the line of Mr. Root's speech.

Hon. W. M. O. Dawson, Governor of West Virginia, took the platform at the close of Secretary Cortelyou's remarks, and spoke on the necessity of conserving the country's resources in coal, petroleum, natural gas, etc. He said that no state in the Union can say that its affairs are of importance to no one save the people within its borders. If the people in Missouri are wasting a part of the common heritage of the whole country, he said, the people of West Virginia, as a part of this common country, are interested in seeing that Missouri stops such waste; and, likewise, if West Virginia wastes the natural resources that are the common property of all the people, all the other states are interested in seeing that the waste in West Virginia is ended.

After some little discussion it was decided that the Governors, governors' advisers, members of Congress, members of the Supreme Court, and members of the Cabinet be given equal privilege in the matter of being heard, and after a motion to this effect had been made by Governor Blanchard, seconded by Governor Hoch of Kansas, and carried, a motion by Governor Hanly of Indiana, to adjourn, closed the first day of the Conference.

SECOND DAY'S SESSIONS

The morning session of Wednesday, May 14, was called to order at ten o'clock, Governor Johnson, of Minnesota, taking the chair when President Roosevelt retired. The session was opened with the address by Mr. James J. Hill.

Mr. Hill was originally scheduled to read a paper on "Transportation,"

and according to the original program his paper was to have been read at the morning session of May 15. This was changed, however, and Mr. Hill's subject was "The Natural Wealth of the Land and its Conservation." It is perhaps not generally known that the great railway magnate is a high authority on this subject, and his pa-

per, in the breadth of information it displayed, was a surprise to a majority of the Conference. Mr. Hill's paper follows:

In some respects the occasion that calls together this assemblage is unprecedented. The dignity and public influence of those present as guests and advisors mark its importance. It is in effect a directors' meeting of the great political and economic corporation known as the United States of America. The stockholders are the 87,000,000 people of this country: the directors are the state and federal officers, whose position brings them in touch with the operation of the whole country. We should not fail to recognize the high note that has been struck and the influence of the interests involved upon the lives of millions yet to be. * * *

The two-fold significance of this meeting is found in the comparative novelty of its subject matter and of the method by which it has been approached. The subject is the conservation of our national wealth, and a careful study of our national economic resources.

Two years ago, in an address delivered before the meeting of the Minnesota State Agricultural Society, at St. Paul, I reviewed the practical consequences and the statistical proof of that national wastefulness which competent scientific authority had already set down as distinguishing the American people. From data of the highest certainty, no one of which has ever since been called in question, I then forecast some of the conditions certain to arise within the next half century, when the population of this country will have grown to more than 200,000,000. The facts were pointed out not in the spirit of the alarmist, but in order that attention might be directed to the way by which the Nation may escape future disaster. So rapidly do events move in our time, so swiftly do ideas spread and grasp the public mind, that some policy directed to the ends then set forth has already become a National care. It is this policy—the conservation of national resources, the best means of putting an end to the waste of the sources of wealth—which largely forms the subject matter of this Conference. For the first time there is a formal national protest, under seal of the highest authority, against economic waste. * * *

"Of all the sinful wasters of man's inheritance on earth," said the late Professor Shaler, "and all are in this regard sinners, the very worst are the people of America." This is not a popular phrase, but a scientific judgement. It is borne out by facts. In the movement of modern times, which has made the world commercially a small place and has produced a solidarity of the races such as never

before existed, we have come to the point where we must to a certain extent regard the natural resources of this planet as a common asset, compare them with demands now made and likely to be made upon them, and study their judicious use. Commerce, wherever untrammelled, is wiping out boundaries and substituting the world relation of demand and supply for smaller systems of local economy. The changes of a single generation have brought the nations of the earth closer together than were the states of this Union at the close of the Civil War. If we fail to consider what we possess of wealth available for the uses of mankind, and to what extent we are wasting a national patrimony that can never be restored, we might be likened to the directors of a company who never examine a balance sheet.

The sum of resources is simple and fixed. From the sea, the mine, the forest and the soil must be gathered everything than can sustain the life of man. Upon the wealth that these supply must be conditioned forever, as far as we can see, not only his progress but his continued existence on earth. How stands the inventory of property for our own people? The resources of the sea furnish less than five per cent of the food supply, and that is all. The forests of this country, the product of centuries of growth, are fast disappearing. The best estimates reckon our standing merchantable timber at less than 2,000,000,000,000 feet. Our annual cut is about 40,000,000,000,000 feet. The lumber cut rose from 18,000,000,000 feet in 1880 to 34,000,000,000 feet in 1905; that is, it nearly doubled in 25 years. We are now using annually 500 feet board measure of timber per capita, as against an average of 60 for all Europe. The New England supply is gone. The Northwest furnishes small growths that would have been rejected by the lumberman of 30 years ago. The South has reached its maximum production and begins to decline. On the Pacific Coast only is there now any considerable body of merchantable standing timber. We are consuming yearly three or four times as much timber as forest growth restores. Our supply of some varieties will be practically exhausted in 10 or 12 years; in the case of others, without reforestation, the present century will see the end. When will we take up in a practical and intelligent way the reforestation of our forests? * * *

The exhaustion of our coal supply is not in the indefinite future. The startling feature of our coal production is not so much the magnitude of the annual output as its rate of growth. For the decade ending in 1905 the total product was 2,832,402,746 tons, which is almost exactly one-half the total

product previously mined in this country. For the year 1906 the output was 414,000,000 tons, an increase of 46 per cent on the average annual yield of the 10 years preceding. In 1907 our production reached 470,000,000 tons. Fifty years ago the annual per capita production was a little more than one-quarter of a ton. It is now about five tons. It is but eight years since we took the place of Great Britain as the leading coal producing nation of the world, and already our product exceeds hers by over 43 per cent, and is 37 per cent of the known production of the world. Estimates of coal deposits still remaining must necessarily be somewhat vague, but they are approximately near the mark. The best authorities do not rate them at much over 2,000,000,000 tons. If coal production continues

States doubles about once in seven years. It was less than 12,000,000 tons in 1893, over 24,000,000 tons in 1899, 47,740,000 tons in 1906 and over 52,000,000 tons in 1907. The rising place of iron in the world's life is the most impressive phenomenon of the last century. In 1850 the pig iron production of the United States amounted to 563,757 tons, or about 50 pounds per capita. Our production now is over 600 pounds per capita. We do not work a mine, build a house, weave a fabric, prepare a meal or cultivate an acre of ground under modern methods without the aid of iron. We turn out over 25,000,000 tons of pig iron every year, and the production for the first half of 1907 was at the rate of 27,000,000 tons. This is two and one-half times the product of Great Britain. It is nearly half the pro-



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"THE HOUSE OF GOVERNORS"

Group of State Executives who took Initial Steps toward forming a Permanent Organization of Governors

to increase as it has in the last ninety years, the available supply will be greatly reduced by the close of the century. Before that time arrives, however, resort to lower grades and sinking of mines to greater depths will become necessary; making the product inferior in quality and higher in price. Already Great Britain's industries have felt the check from a similar cause, as shown in her higher cost of production. Our turn will begin probably within a generation or two from this time. Yet we still think nothing of consuming this priceless resource with the greatest possible speed. Our methods of mining are often wasteful; and we not only prohibit our industries from having recourse to the coal supplies of other countries, but actually pride ourselves upon becoming exporters of a prime necessity of life and an essential of civilization.

The iron industry tells a similar story. The total of iron ore mined in the United

duct of the whole world. And the supply of this most precious of all the metals is so far from inexhaustible that it seems as if iron and coal might be united in their disappearance from common life.

The large deposits of iron ore in this country are now located. For cheap iron we depend upon the Lake Superior district, because of its high grade, the ease of extracting the ore from the mines and its nearness to cheap transportation. At the rate of over 50,000,000 tons per year, our present consumption, it would require over 2,000,000,000 tons to supply the demand for the next 40 years, supposing it to remain stationary. This would approach the end of all the higher grade ore in large deposits now in sight. The product of other workings would be of inferior quality and higher cost and remote from market. But production is certain to increase even more rapidly than in the past. A few

years ago a Swedish geologist prepared for his government a report, stating that the entire supply of the iron ore in the United States would be exhausted within the present century. The United States Geological Survey declared this an overstatement; but here is the conclusion of its own report. I quote the official published document: "Assuming that the demand for iron ore during the present century may range from 50,000,000 to 100,000,000 tons per year, the Lake Superior district would last for from 25 to 50 years more, if it supplied the entire United States. But counting on the known reserves elsewhere in the United States the ore will last for a much longer period, though, of course, it must necessarily show a gradual, but steady increase in value and in cost of mining, along with an equally steady decrease in grade." The most favorable view of the situation forces the conclusion that iron and coal will not be available for common use on anything like present terms before the end of this century; and our industrial, social and political life must be readjusted to meet the strains imposed by new conditions. Yet we forbid to our consumers access to the stores of other countries, while we boast of our increased exports, of that material for want of which one day the nation must be reduced to the last extremity.

We now turn to the only remaining resource of man upon this earth, which is the soil itself. How are we caring for that, and what possibilities does it hold out to the people of future support? We are only beginning to feel the pressure upon the land. The whole interior of this continent, aggregating more than 500,000,000 acres, has been occupied by settlers within the last 50 years. What is there left for the next 50 years? Excluding arid and irrigable areas, the latter limited by nature, and barely enough of which could be made habitable in each year to furnish a farm for each immigrant family, the case stands as follows: In 1906 the total unappropriated public lands in the United States consisted of 792,000,000 acres. Of this area the divisions of Alaska, Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico and Wyoming contained 195,700,000 acres of unsurveyed land. Little of Alaska is fitted for general agriculture, while practically all of the rest is semi-arid, available only for grazing or irrigation. We have (subtracting these totals) 50,000,000 acres of surveyed and 36,500,000 acres of unsurveyed land as our actual remaining stock. And 21,000,000 acres were disposed of in 1907. How long will the remainder last? No longer can we say that "Uncle Sam has enough to give us all a farm."

Equally threatening is the change in quality. There are two ways in which the productive power of the earth is lessened; first by erosion and the sweeping away of the

fertile surface into streams and thence to the sea, and, second, by exhaustion through wrong methods of cultivation. The former process has gone far. Thousands of acres in the East and South have been made unfit for tillage. North Carolina was, a century ago, one of the great agricultural states of the country and one of the wealthiest. Today as you ride through the South you see everywhere land gullied by torrential rains, red and yellow clay banks exposed where once were fertile fields; and agriculture reduced because its main support has been washed away. Millions of acres, in places to the extent of one-tenth of the entire arable area, have been so injured that no industry and no care can restore them.

Far more ruinous, because universal and continuing in its effects, is the process of soil exhaustion. It is creeping over the land from East to West. The abandoned farms that are now the playthings of the city's rich or the game preserves of patrons of sport, bear witness to the melancholy change. New Hampshire, Vermont, northern New York, show long lists of them. In Western Massachusetts, which once supported a flourishing agriculture, farm properties are now for sale for half the cost of the improvements. Professor Carver, of Harvard, has declared, after a personal examination of the country, that "agriculture as an independent industry, able in itself to support a community, does not exist in the hilly parts of New England."

The same process of deterioration is affecting the farm lands of western New York, Ohio and Indiana. Where prices of farms should rise by increase of population, in many places they are falling. Between 1880 and 1900 the land values of Ohio shrank \$60,000,000. Official investigation of two counties in central New York disclosed a condition of agricultural decay. In one land was for sale for about the cost of improvements, and 150 vacant houses were counted in a limited area. In the other the population in 1905 was nearly 4,000 less than in 1855.

Practically identical soil conditions exist in Maryland and Virginia, where lands sell at from \$10 to \$30 an acre. In a hearing before an Industrial Commission, the chief of the Bureau of Soils of the Department of Agriculture said: "One of the most important causes of deterioration, and I think I should put this first of all, is the method and system of agriculture that prevails throughout these states. Unquestionably the soil has been abused." The richest region of the West is no more exempt than New England or the South. The soil of the West is being reduced in agricultural potency by exactly the same processes which have driven the farmer of the East, with all his advantage of nearness to markets, from the field.

Within the last forty years a great part of

the richest land in the country has been brought under cultivation. We should, therefore, in the same time, have raised proportionately the yield of our principal crops per acre; because the yield of old lands, if properly treated, tends to increase rather than diminish. The year 1906 was one of large crops and can scarcely be taken as a standard. We produced, for example, more corn that year than had ever been grown in the United States in a single year before. But the average yield per acre was less than it was in 1872. We are barely keeping the acre product stationary. The average wheat crop of the country now ranges from twelve and one-half, in ordinary years, to fifteen bushels per acre in the best seasons. And so it is on down the line.

But the fact of soil waste becomes startlingly evident when we examine the record of some states where single cropping and other agricultural abuses have been prevalent. Take the case of wheat, the mainstay of single-crop abuse. Many of us can remember when New York was the great wheat-producing state of the Union. The average yield of wheat per acre in New York for the last ten years was about eighteen bushels. For the first five years of that ten-year period it was 18.4 bushels, and for the last five 17.4 bushels. In the farther West, Kansas takes high rank as a wheat producer. Its average yield per acre for the last ten years was 14.16 bushels. For the first five years it was 15.14 and for the last five 13.18. Up in the Northwest, Minnesota wheat has made a name all over the world. Her average yield per acre for the same ten years was 12.96 bushels. For the first five years it was 13.12 and for the last five 12.8. We perceive here the working of a uniform law, independent of location, soil or climate. It is the law of a diminishing return due to soil destruction. Apply this to the country at large, and it reduces agriculture to the condition of a bank whose depositors are steadily drawing out more money than they put in.

What is true in this instance is true of our agriculture as a whole. In no other important country in the world, with the exception of Russia, is the industry that must be the foundation of every state, at so low an ebb as in our own. According to the last census the average annual product per acre of the farms of the whole United States was worth \$11.38. It is little more than a respectable rental in communities where the soil is properly cared for and made to give a reasonable return for cultivation. There were but two states in the Union whose total value of farm products was over \$30 per acre of improved land. The great state of Illinois gave but \$12.48, and Minnesota showed only \$8.74. No discrimination attaches to these figures, where all are so much at fault. Nature has given to us the most valuable possession ever

committed to man. It can never be duplicated, because there is none like it upon the face of the earth. And we are racking and impoverishing it exactly as we are felling the forests and rifling the mines. Our soil, once the envy of every other country, the attraction which draws millions of immigrants across the seas, gave an average yield for the whole United States during the ten years beginning with 1896 of 13.5 bushels of wheat per acre. Austria and Hungary each produced over seventeen bushels per acre, France 19.8, Germany 27.6 and the United Kingdom 32.2 bushels per acre. For the same decade our average yield of oats was less than thirty bushels, while Germany produced forty-six and Great Britain forty-two. For barley the figures are twenty-five against thirty-three and 34.6; for rye 15.4 against twenty-four for Germany and twenty-six for Ireland. In the United Kingdom, Belgium, the Netherlands and Denmark a yield of more than thirty bushels of wheat per acre has been the average for the past five years. * * *

Our agricultural lands have been abused in two practical ways; first by single cropping, and second by neglecting fertilization. It is fortunate for us that nature is slow to anger, and that we may arrest the consequence of this ruinous policy before it is too late. In all parts of the United States the system of tillage has been to select the crop which would bring in the most money at the current market rate, to plant that year after year, and to move on to virgin fields as soon as the old farm rebelled by lowering the quality and quantity of its return. It is still the practice; although diversification of industry and the rotation of crops have been urged for nearly a century and are today taught in every agricultural college in this country. The demonstration of the evils of single cropping is mathematical in its completeness. At the experiment station of the Agricultural College of the University of Minnesota they have maintained 44 experimental plots of ground, adjoining one another, and as nearly identical in soil, cultivation and care as scientific handling can make them. On these have been tried and compared different methods of crop rotation and fertilization, together with systems of single cropping. The results of ten years' experiment are now available. On a tract of good ground sown continuously for ten years to wheat, the average yield per acre for the first five years was 20.22 bushels and for the next five 16.92 bushels. Where corn was grown continuously on one plot while on the plot beside it corn was planted but once in five years in a system of rotation, the average yield of the latter for the two years it was under corn was 48.2 bushels per acre. The plot where corn was grown gave

20.8 bushels per acre for the first five and 11.1 bushels for the second of these years, an average of sixteen bushels. The difference in average of these two plots was 32.2 bushels, or twice the total yield of the ground exhausted by the single crop system. The corn grown at the end of the ten years was hardly hip high, the ears small and the grains light. But the cost of cultivation remained the same. And the same is true of every other grain or growth when raised continuously on land unfertilized. We frequently hear it said that the reduction in yield is due to the wearing out of the soil as if it was a garment to be destroyed by the wearing. The fact is that soils either increase or maintain their productivity indefinitely under proper cultivation. If the earth is to "wear out," what is to become of the race?

The two remedies are as well ascertained as is the evil. Rotation of crops and the use of fertilizers act as tonics upon the soil. We might expand our resources and add billions of dollars to our national wealth by conserving soil resources, instead of exhausting them as we have the forests and the contents of the mines. For there is good authority for the assertion that the farmer could take from the same area of ground in four years' grain crops out of a total of seven years as much as the whole seven now give him; leaving the products of the other three years when the land rested from grain as clear profit due to better methods.

He can do far more than that by joining stock raising with grain raising. Nature has provided the cattle to go with the land. There is as much money in live stock as there is in grain. Looked at in any way there is money in live stock; money for dairy products, money for beef, money for the annual increase, and most money of all for the next year's crop when every particle of manure is saved and applied to the land.

We need not consider at present really intensive farming, such as is done by market gardeners with high profit, or such culture as in France, in Holland, in Belgium and in the island of Jersey produces financial returns per acre that seem almost beyond belief. What our people have to do is to cover less ground, cultivate smaller farms so as to make the most of them, instead of getting a scant and uncertain yield from several hundred acres, and raise productivity, by intelligent treatment, to twice or three times its present level.

There is more money in this system. The net profit from an acre of wheat on run-down soils is very small; consequently decreasing the acreage of wheat under certain conditions will not materially decrease profits. Here are

some reliable estimates. The price of wheat is given from the United States Department of Agriculture Yearbook.

Yield.	Price.	Market value per acre.	Cost of production, including rent.	Net profit or loss.
20.....	\$0.638	\$12.76	\$ 89	+ \$4.87
16.....	.638	10.21	7.89	+ 2.32
12.....	.638	7.66	7.89	- .23
10.....	.638	6.38	7.89	- 1.51
8.....	.638	5.10	7.89	- 2.79

I have dwelt upon the conservation of farm resources because of the commanding importance of this industry and because of its relation to our future. Nearly thirty-six per cent of our people are engaged directly in agriculture. But all the rest depend upon it. In the last analysis, commerce, manufactures, our home market, every form of activity runs back to the bounty of the earth by which every worker, skilled and unskilled, must be fed and by which his wages are ultimately paid. The farm products of the United States in 1906 were valued at \$6,794,000,000 and in 1907 at \$7,412,000,000. All of our vast domestic commerce, equal in value to the foreign trade of all the nations combined, is supported and paid for by the land. Of our farm area only one-half is improved. It does not produce one-half of what it could be made to yield; not by some complex system of intensive culture, but merely by ordinary care and industry intelligently applied. It is the capital upon which alone we can draw through all the future, but the amount of the draft that will be honored depends upon the care and intelligence given to its cultivation. Were any statesman to show us how to add \$7,000,000,000 annually to our foreign trade, it would be the sensation of the hour. The way to do this in agriculture is open. Our share in the increase would not be the percentage of profit allowed by successful trading, but the entire capital sum. On the other side stands the fact that the unappropriated area suited to farm purposes is almost gone, and that we have been for the last century reducing the producing power of the country. Nowhere in the range of national purposes is the reward for conservation of a national resource so ample.

By the fixed rate of increase in the past, we must count upon a population



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PROMINENT FIGURES AT THE CONFERENCE

Standing—Secy. Shipp, Gov. Swanson, Chief Forester Pinchot, Gov. Folk
 Sitting—Gov. Willson, Gov. Sheldon. Willson, Sheldon and
 Folk, committee on permanent organization. Swanson,
 and Willson, committee on ways and means

of over 200,000,000 in the United States in the year 1950. The annual increase from natural growth is about one and one-half per cent each year. Adding for immigration only 750,000 a year, which is less than three-quarters of the figures reached in recent years, we shall have about 130,000,000 people in 1925 and at least 200,000,000 by the middle of the century. Where are they to go, how are they to be employed, how fed, how enabled to earn a living wage? The pressure of all the nations upon the waste places of the earth grows more intense as the last of them are occupied. We are approaching the point where all our wheat product will be needed for our own uses, and we shall cease to be an exporter of grain. There is still some room in Canada, but it will soon be filled. The relief will be but temporary. Our own people, whose mineral resources will by that time have greatly

diminished, must find themselves thrown back upon the soil for a living. If continued abuse of the land should mark the next fifty years as it has the last, what must be our outlook? * * *

Not only the economic but the political future is involved. No people ever felt the want of work or the pinch of poverty for a long time without reaching out violent hands against their political institutions, believing that they might find in a change some relief from their distress. Although there have been moments of such restlessness in our country, the trial has never been so severe or so prolonged as to put us to the test. It is interesting that one of the ablest men in England during the last century, a historian of high merit, a statesman who saw active service and a profound student of men and things, put on record his prophecy of such a future ordeal. Writing to an American

correspondent fifty years ago, Lord Macaulay used these words: "As long as you have a boundless extent of fertile and unoccupied land your laboring population will be found more at ease than the laboring population of the Old World; but the time will come when wages will be as low and will fluctuate as much with you as they do with us. Then your institutions will be brought to the test. Distress everywhere makes the laborer mutinous and discontented and inclines him to listen with eagerness to agitators who tell him that it is a monstrous iniquity that one man should have a million and another cannot get a full meal. * * * The day will come when the multitudes of people, none of whom has had more than half a breakfast or expects to have more than half a dinner, will choose a legislature. Is it possible to doubt what sort of legislature will be chosen? * * * There will be, I fear, spoliation. The spoliation will increase the distress; the distress will produce a fresh spoliation. * * * Either civilization or liberty will perish. Either some Caesar or Napoleon will seize the reins of government with a strong hand, or your republic will be as fearfully plundered and laid waste by barbarians in the twentieth century as the Roman Empire in the fifth." We need not accept this gloomy picture too literally, but we have been already sufficiently warned to prevent us from dismissing the subject as unworthy of attention. Every nation finds its hour of peril when there is no longer free access to the land, or when the land will no longer support the people. * * * Far may this day be from us. But since the unnecessary destruction of our land will bring new conditions of danger, its conservation, its improvement to the highest point of productivity promised by scientific intelligence and practical experiment, appears to be a first command of any political economy worthy of the name.

If this patriotic gospel is to make headway, it must be by just such organized missionary work as is to-day begun. It cannot go on and conquer if imposed from without. It must come to represent the fixed idea of the people's mind, their determination and their hope. It cannot be incorporated in our practical life by the dictum of any individual or any officer of Nation or State in his official capacity. It needs the co-operation of all the influences, the help of every voice, the commendation of Nation and State that has been the strength and inspiration of every worthy work on American soil for 120 years. We return, for our gathering in council and for our plan of action for the future, to the model given us by the Fathers. State and Nation are repre-

sented here, without jealousy or any ambition of superiority on either side, to apply to the consideration of our future such co-operation as that out of which this Nation was born and by which it has won to worthy manhood. Reviving the spirit of the days that created our Constitution, the days that carried us through civil conflict, the spirit by which all our enduring work in the world has been wrought, taking thought as Washington and Lincoln took thought, only for the highest good of all the people, we may, as a result of the deliberations held and the conclusions reached here to-day, give new meaning to our future; new lustre to the ideal of a Republic of living federated states; shape anew the fortunes of this country, and enlarge the borders of hope for all mankind.

Immediately after the conclusion of Mr. Hill's paper, Dr. Thomas C. Chamberlain, President of the American Association for the Advancement of Science, head of the department of Geology, University of Chicago, and editor of the *Journal of Geology*, read a paper on "Soil Wastage." Dr. Chamberlain stated that his studies and investigations have brought him to the belief that the era of the earth's future habitability is vastly greater than we have been wont to think. He stated that it is a familiar deduction of geology that for untold ages rains have fallen on the lands, and soils have grown in depth while the surface has been washed away. Production and removal, he said, have run hand in hand, and yet they have been controlled to such a degree by the adjustments of nature that no part of the surface seems ever to have been so far denuded that plants could not grow on it. More than this, it appears, said Dr. Chamberlain, that the ordinary adjustments of nature make for the increasing fertility of the soil, rather than for depletion. Dr. Chamberlain's address follows:

The invitation to give thought to the resources that affect our future appeals to me with peculiar—indeed almost personal—force, for my studies of the past decade have led to the belief that the era of the earth's future habitability is vastly greater than we have been wont to think. We have grown up in the belief that the earth sprang from chaos at the opening of our era and is plunging on to catastrophe or to

a final winter in the near future. Quite at variance with this, I have come to believe that the earth arose from a regenerative process and that it offers a fair prospect of fitness for habitation for ages yet to come. If this be true, it is eminently fitting that our race should give a due measure of thought to the ulterior effects of its actions.

It is one of the latest conceptions of geology that climatic conditions have been of the same order as at present from early eras, in the large view, in spite of some notable variations, and that this uniformity is the result of a *profound regulative system* which has sufficed to keep the temperatures of the earth's surface and the constitution of the earth's atmosphere within the narrow range congenial to life for a vast period. As a result there has been no break in the continuity of land life since it came into being eras ago. It appears further that the sources of supply of the vital elements are still adequate, and are likely to be so for long ages, that the regulative system is still in effective control, and that a vast future of habitability may fairly be predicted. Whether you are prepared to accept so large a view of the habitable future or not, I trust you will strike hands with me in the conviction that the probabilities of the future are at least so great as to render imperative the serious consideration of our obligations toward it.

Let us turn at once to the basal factor in the problem, the rainfall, the soil, and soil-wastage, the special theme of this hour. The rainfall is an inherited asset, the soil is an inherited asset, even a little soil is an asset, but reckless soil-wastage is a serious error. Soils are the product of the atmosphere and its waters modifying the rock surface. When the atmospheric waters have aided the air in producing soil by rock decay they pass, on the one hand, into plants or back to the surface soil and thence through these again to the atmosphere by evaporation, or, on the other hand, they pass on down to the ground-waters and thence into the streams, furnishing in them the basis for water-foods, of power, and for navigation. Here is a good deed—soil production—followed by a laudable course either up or down with beneficent results in either course. The alternative is to rush away as foul erosive floods on the surface, wasting soil and plant food, gully-ing the surface, choking the ravines, flooding the valleys, silting the pools, filling the reservoirs, sweeping out the dams, barring the streams and clogging the deltas. If it shall be found that all or nearly all the waters should go into the soil and thence into the underdrainage, coming out slowly and steadily by seepage and by springs into the streams, these streams should present nearly ideal conditions for water-food, for water-power, and for river-navigation. The solution of the soil problem may therefore be, in large part, the solution of the whole

complex of problems of which navigation is the last term. It may thus prove to be the key problem.

We have as yet no accurate measure of the rate of soil production. We merely know that it is *very slow*. It varies obviously with the kind of rock. Some of our soils are derived from material already reduced to a finely pulverized condition. Such are the lowland accumulations from highland wash. Such also is the glacial drift, rock-flour rasped from the face of the rock by the glacial file and ground up with old soils. Soils may be developed from such a base of half-prepared material with relative rapidity, but observation shows that even on these, when the slope is considerable, wind, wash and cropping remove the surface much too fast for stable fertility. But for average rock, under ordinary favorable conditions, in our range of climate, the usual estimate has been a foot of waste in 4,000 to 6,000 years, which includes channel cutting and bank-undermining. These are too rapid for ordinary soil waste and replacement under our normal conditions. Without any pretensions to a close estimate, I should be unwilling to name a mean rate of soil-formation greater than one foot in 10,000 years on the basis of observations since the glacial period. I suspect that if we could positively determine the time taken in the formation of the four feet of soil next to the rock over our average domain, where such depth obtains, it would be found above rather than below 40,000 years. Under such an estimate, to preserve a good working depth, surface wastage should not exceed some such rate as one inch in a thousand years. If one chooses to indulge in a more liberal estimate of the soil-forming rate, it will still appear, under any intelligent estimate, that surface wastage is a serious menace to the retention of our soils under present modes of management. Historical evidence enforces this danger. In the Orient there are large tracts almost absolutely bare of soil on which stand ruins which imply former flourishing populations. Other long-tilled lands bear similar testimony. It must be noted that more than loss of fertility is here menaced. It is the loss of the soil-body itself, a loss almost beyond repair. When our soils are gone, we too must go, unless we shall find some way to feed on raw rock or its equivalent. The immense tonnage of soil-material carried out to sea annually by our rivers, even when allowance is made for laudable wash, and for material derived from the river channels, is an impressive warning of the danger of negligent practices. Nor is this all; the wash from one acre is often made the waste-cover for another acre, or for several. Sometimes one's loss is another's gain, but all too frequently one's loss is another's disaster.

If the atmospheric waters may not run

off the surface freely without serious menace, where may they go and what may they do consistent with our welfare? The answer lies in a return to the study of the origin and internal work of soils. For necessary brevity, let us neglect all secondary soils, or overplacements, and consider simply the origin and activities of primary soils derived from primary rocks. The action of air and water in producing soil from such rock is partly chemical and partly physical. Certain rock substances are made soluble and become plant food or plant poisons, while others remain relatively insoluble but are reduced to a finely divided state and form the earthy element of the soil.

Some of the soluble substances thus formed at the base of soils are necessary plant food, while some are harmful; but what is more to the point, all are harmful if too concentrated. There is need therefore that enough water passes through the forming soil, and on down to the groundwater and out through the underdrainage, to carry away the excess of these products. An essential part of the best adjustment is thus seen to lie in a *proper apportionment of the amount of water which goes through the soils*. If this be not enough, the plants will suffer from saline excess; if too much, the plants may suffer from saline deficiency.

When evaporation from the surface is active and prolonged, waters which had previously gone down to the zone of soil-formation and taken up soluble matter, rise again to the surface bringing the soluble matter up and leaving it at the surface on evaporation. Up to a certain point this is favorable to the plant; beyond the critical point, it begins to be harmful, as abundantly shown in the "alkaline" efflorescences of arid regions.

Beside the water that goes through the soil into the subdrainage, and that which runs off on the surface, enough must be held at all times in the soil during the growing season to supply the plants, and yet not enough to water-log the soil.

The key to the problem lies in due control of the water which falls on each acre. This water is an asset of great possible value. It should be looked upon as such. It should be computed by every acre-owner as a possible value, saved if turned where it will do good, lost if permitted to run away, doubly lost if it carries also soil values and does destructive work below. Let us repeat the story of its laudable paths. A due portion of this should go into the underdrainage *carrying away harmful matter*; a due portion should go again *up to the surface carrying solutions needed by the plants*; a due portion should obviously go into the plants to nourish them; while still another portion should run off the surface carrying away a little of the leached soil matter. There are a multitude of important details in this complex of actions but they must

be passed by; the great features are clear and imperative.

Experimental studies have shown that, on the average within our domain, *crops can use to advantage all the rainfall during the growing season*, and that, in most cases, *crops are better for all the stored supplies that can be carried over from the non-growing seasons*. This greatly simplifies the general problem, for it justifies the conclusion—to which there are many local exceptions, of course—that the highest crop-values will usually be secured when the soil is made to absorb as much of the rainfall and snowfall as practicable. In securing this maximum absorption and internal soil-work, the run-off, and hence the surface wash, will be reduced to a minimum. It has already been seen that the wash of even this inevitable minimum is likely to be still too great to keep the proper slow pace with soil-generation, when the surface has much slope. Except on very level ground and on lodgment surfaces, there need be no solicitude about a sufficient removal of the soil surface. The practical problem then lies almost wholly in retaining and passing into the soil the maximum of the precipitation. Obviously this gives the minimum of wash to foul the streams, to spread over the bottom lands, to choke the reservoirs, to waste the water-power, and to bar up the navigable rivers. *The solution of the problem for the tiller of the soil essentially solves the whole train of problems.*

How is this control to be effected? As a geologist, I naturally turn first to nature's time-tested processes. Nature has been working on this complex problem of balance between soil formation, soil waste, surface slope, plant growth, and stream development, for millions of years, and we have inherited the result, a magnificent inheritance. The larger part of our domain, when invaded by us, had reached a fair adjustment of slopes to precipitation, was covered with a soil-mantle of fair depth and high average fertility, and was clothed with rich vegetation. There were exceptions to this, and some of these were large, but limitations of time shut out such exceptions here.

Looking at nature's methods for suggestions, we note that a much larger variety of plants are used by nature to cover and protect the soil than we use, and that these have a wider range of adaptation to the special situations where protection is needed. This invites the inquiry whether it is not possible to follow this precedent further than we have done by developing a larger number of profitable plants, among which shall be more that are adapted to protecting the surface, and to growing on slopes specially subject to wash. Forest trees are an important resource of this kind and should be employed as fully as practicable, as will, no doubt, be urged with great cogency by those who discuss the problem



WISCONSIN'S RAVISHED FORESTS
Burned-off White Pine Lands in Douglas County

of forestry. We also have many berry-bearing shrubs, vines and fruit trees, whose employment to the maximum in covering slopes is likewise urged either alone or in conjunction with trees. But, for the greater part, berries and fruits are perishable and have limitations of preservation, transportation, market, etc. But if shrubs could be evolved by modern selective methods whose nut-meats or dry seeds should be suitable for food in place of the watery pulp, and which could be treated much as cereals are, and have similar wide year-round markets, there would be a larger choice of crops to grow in soils subject to wash, and we might secure soil-protection with less crop-limitation. There would then be less need to press the culture of the cereals so far as we do now, and they could be limited more largely to surfaces less subject to harmful soil-loss.

Another marked feature of nature's method is the development of plant-societies, or from our point of view, combination-crops. There can be no doubt that there is much deleterious crowding and repressive rivalry among the natural mixtures of plants, but at the same time, there seem to be associations that are mutually beneficial. No doubt man secures a great temporary advantage by isolating chosen plants and freeing them from competition, but this is clearly at some permanent disadvantage which is partially corrected by rotation, fertilizing, and tith. Cannot a greater ad-

vantage be secured by a larger use of the combination method? It is clear that legumes and cereals are helpful associates in rotation and in some combinations. May not this be pushed so far by skillful selection and proper culture that legumes and helpful associates may replace weeds in becoming the constant and spontaneous associates of cereal crops, so that, while kept in such subordination as to be the servants of the cereals, they may still aid in covering and protecting the soil and thus guard against undue surface loss. Certainly much can be done by such plants, used as fall and spring crops, to cover the soil when specially exposed to wastage.

The full list of tried methods should be pressed into the utmost employment.

Since the chief object is to cause the maximum of rainfall to be absorbed into the soil, it is obvious that all methods of culture and all crops that increase the granularity and porosity of the soil contribute to the end sought. Deep tith to promote soil granulation, and deep-rooting plants to cause root-tubes, are specific modes of great value.

Artificial underdrainage by preventing the water-logging of the soil and by promoting its granulation, assists in absorption and transmission.

Contour cultivation, by arresting the direct descent of the waters on the surface and distributing them along the slopes, when properly controlled aids absorption

and limits surface wash. On the steeper slopes, special devices may be used to supplement contour cultivation, such as strips of grass-land, shrub-land, or trees, alternating with zones of plow-land. Reservoirs at the heads of ravines and at suitable heights in the ravines where surface wash is concentrated, may be used to arrest storm-floods, and if these are connected with lines of tile-drain following contours on either hand, the concentrated waters will be redistributed and at the same time transferred from the surface to the subsoil.

These and similar devices serve to limit the wash of the slopes, but the more radical and permanent remedies will, I think, be found in the development of values in trees, shrubs, vines, and grasses to such an extent that they may be employed almost exclusively in clothing the steeper slopes where wash is most menacing, and where the usual modes of culture that give rise to bare surfaces during portions of the year can scarcely fail to involve a degree of wash which cannot be replaced by soil growth below. Is not the time at hand when trees, shrubs, vines, grasses, and combinations of these, may be so developed and extended in value and availability by modern selective processes that they shall become sufficiently profitable crops to monopolize all the areas where wash threatens the ultimate removal of the whole soil? By such extension of these crops may not the bare-surface culture be so limited to relatively level lands as to cause in these, when intelligently handled, only that degree of surface loss which they can stand without menace to the perpetuity of the soil?

But a critical question remains to be answered: Can such modes of soil-management and crop-selection be made to give reasonable profits? Before we can hope that the millions who till the soil will join effectively in a radical scheme of soil-conservation, it must be made to appear that it will give some reasonable returns at every large stage of its progress; must pay, let us say, in the long run of a lifetime. We may fairly assume that intelligent people will be guided by the total returns of a lifetime, in lieu of beguilement by the ultra-quick returns of forced and wasteful cropping in total neglect of later results. It may be assumed that he who tills a farm from his twentieth to his sixtieth year will find more satisfaction in the summed profits of forty crops of increasing value enhanced by the higher value of his land at the end, even though the margin above cost be no greater, than in the sum of forty crops of decreasing values with a debased value of the land at the end. Our practical problem is therefore so to improve processes, so to increase intelligent management, and so to exalt the point of view, that every step in the processes proposed shall give satisfactory returns for the labor involved. How far this is practicable just now, I must leave to

those whose technical knowledge in the practical art of tilling fits them to answer; but in any event, it seems that this must become so in time; for if the loss of soils proceeds at the present rate and the number of inhabitants continues to increase as now, the value of the residue of tillable land which will remain after a few centuries will so appreciate as to force extreme measures for its conservation. The pitiable struggles of certain Oriental peoples to retain and cultivate the scant remnant of once ample soils is at once an example and a warning. Our escape from this dire struggle should spring from a clearer forevision, a deeper insight, greater technical skill, and indefatigable industry.

Before the discussion of these papers was opened, Hon. James Wilson, Secretary of Agriculture, was called upon by the Conference and responded with a brief address that was crowded in every crisp sentence with hard, common sense.

Secretary Wilson opened his remarks by saying that he did not think it wise for him to say anything to the Conference. "I have been filling up since you came here," he said, "and really you should do the talking and give us instruction. I am one of the servants of the American people, and I am anxious to know what is best to be done for the general good."

Continuing, Secretary Wilson said:

"The paper read by Mr. Hill this morning made a very deep impression upon me. The greatest asset we have in the United States is our soil; we are destroying that as rapidly as we can, and the oldest settled part of the United States has made the most progress in the destruction of our soil (laughter), of which we have a great variety. Down on the Gulf coast the land has been peopled longer than the upper part of the Mississippi Valley. The heavy rainfalls, and the perpetual cultivation and growing of crops have helped erosion, and the soil has been destroyed in that way. It is going off very, very rapidly. The cure is a system of agriculture that will keep the soil filled with plant food, organic matter, humus. That is the cure; that is the way to keep up the soil. Somebody once asked an English gardener how he got such a fine lawn. He had a beautiful grass lawn which attracted attention. He said, 'We weeded, and we weeded; we manured and we manured, for eight hundred years; and that is the way they got it. (Laughter.)'

"Now, jumping from one part of the United States to another—because I am go-

ing to speak but a very few minutes—the people in the grass belt of the Mississippi Valley have ceased to grow crops to so great an extent as they do in some other parts of the country. They grow grass, because they are compelled to. The factory, the railroad, the mine, have taken away the farm help, and farmers are not able to compete with those other institutions in hiring men. So far as the poor land is concerned, the land is being abandoned and is going back to nature; and nature is good to it, if you give her time. But this results, too, in rich land being put in grass.

"Anybody in studying wheat and looking into the production of one of those states that at one time grew fifty million bushels will discover that now they grow scarcely any. Why? It does not pay them. Put wheat up to a dollar a bushel and the state of Iowa will grow fifty million of bushels a year. They will plow up the pastures and grow wheat.

"The people of the Southern states were not able to engage in cattle raising, because nature had planted there an obnoxious tick, and the business was not profitable; but the United States Government has set about destroying that tick, and the effort will succeed. Those people will get cattle; the people will grow grasses; the grasses will fill the soil; erosion will cease, and when they want a great cotton crop they will plow up the soil, as the man in Iowa plows up the pasture to get a corn or a wheat crop. (Applause.)

"Go further west, into what was known as the Great American Desert, and which is to all intents and purposes the American desert now, west of the one hundredth meridian. The Department of Agriculture hunted the world over for plants that grew in dry regions, and along the deserts in Asia and Africa they found such plants. They found a hard wheat; and we had quite an interesting time in getting it introduced, because the miller did not want to grind hard wheat; it took more power. But we heard of fifty million bushels of it last year. (Applause.) It is the richest wheat that grows; there is more nutriment in it than in any other wheat, and to-day it is growing all the way from the Dakotas to the Pacific Ocean.

"But you cannot grow crops forever without legumes. The people out West have a rich land; the disintegrated rock has not been carried away, as in the Southern states, by floods of water, because they do not have floods of water. (Laughter.) When the irrigation problem, under my friend Newell here, lets water on that land it will grow anything, because it is exceedingly rich.

"When you speak of the destruction of a soil it means that you have taken away that part of the plant's food that comes from the atmosphere; and good farming means the keeping of a supply of organic matter in the soil.

"It is well to apply fertilizer if your system of farming is such that you cannot get a pasture. But the people in the Mississippi Valley never have used fertilizers, and, let me tell you, they never will, because there is not enough fertilizer to be had in the market to supply the American farmer. We have got to farm without it; that is what we have got to do. And the people in the dry regions of the West are some day going to supply the cities of the East with wheat from that same dry region. (Applause.)

"We sent men two years ago way up into Northern Siberia to find wheat and legumes for North Dakota. We knew it must be there, because man could not live without legumes; and when we went there we found a clover that lived in the winter, with the thermometer six degrees below freezing; and we found a new alfalfa. We are going to bring this winter wheat and this clover and alfalfa here this summer and take them out to the people west of the one hundredth meridian, and then these people will be ready to farm." (Great applause.)

When Secretary Wilson had closed his remarks, Governor Johnson started a hearty laugh among the politicians present by a humorous application of one of the points made by the Secretary. He said: "I think the Secretary has struck a very happy note in one thing. He has advised a remedy. He says that we must have something from the atmosphere for the enrichment of the soil. I know there are a number of men here who are in politics, and it seems to me that this will give a number of our politicians a steady occupation. If hot air is just as good as cold, we know now what the politicians of the future have got to do."

Mr. Jas. S. Whipple, State Forest, Fish and Game Commissioner of New York, one of the advisers chosen by Governor Hughes of New York, made a short talk on forestry conditions as they exist in the Empire State, and told what that state is doing along the line of forest conservation. Mr. Whipple said:

"We have in the state of New York 41,000,000,000 feet of lumber, board measure, standing, including farm lots and all. The state owns 1,500,000 acres of woodlands, which, under the Constitution, cannot be touched; and therefore that must be deducted from the whole amount. We cut

last year 1,250,000,000 board measure. A simple mathematical calculation will tell us that in twenty-two or twenty-three years, at that rate, not one solid stick will stand in the Empire State, although twenty-seven per cent of our total area is now covered with forests.

"The state's agricultural lands are depreciating in productive value, as has been stated by the Secretary of Agriculture and by Mr. Hill, and the water sources are drying up. The formation of New York is such that most of the water comes from the great upland plateau, extending from the Adirondacks to the foothills of the Alleghanies. In such a state it is especially imperative that the forests be preserved in sufficient quantity, else our agricultural lands will be depleted to such an extent that it will not be practical to farm them. Suppose that in an hour, by reason of some great natural catastrophe, every tree should be swept from the state of New York, what would be the result? Chaos, desolation everywhere, streams dried up, dry creek beds and river beds in July and August, no water for the farm, agricultural products decreased fifty per cent, and price of farms decreased as much, or more.

"Therefore, for the benefit of agriculture alone, to say nothing about the question of a timber supply, which is so imperative, all sensible men ought to read the history of the countries that have demonstrated this fact for a thousand years, and act upon the teachings of that history. They should not sit quietly by and see their forests wiped away and the interests of their country ruined beyond repair—for it takes one hundred years to grow a tree that can be cut down in five minutes. The most imperative thing we have to do is to save the forests of this country. (Great applause.)

"Let me tell you what we are doing in the state of New York. We planted last year 1,100,000 pine trees in the waste lands of the Adirondacks. Look at the history of forestry in your states and in the Nation, and you will see that New York has planted as many trees as all of the states and the National Government combined. Mr. Pinchot sent his forester to our gardens last year, and he said that they are the best in the United States. We have ten or twelve acres, all told, of tree gardens. What of other countries? German has fifteen or twenty tree gardens of two hundred acres each, and they raise 10,000 trees in one little bed, while the Empire State has twelve acres of tree gardens to furnish its trees.

"Coal cannot be reproduced; iron cannot be reproduced; but the forests can be reproduced, and if you preserve the forests by planting, and by careful cutting, you will have water courses, and your water courses will save the forests and save the farms.

"Last year we cut an acreage five times as great as that which was replaced. The rate of cutting is increasing every year, and

I ask you what are we coming to? If we cut last year five times the amount that was replaced, and if we cut this year eight times the amount replaced, and if next year we cut ten or twelve times the amount replaced, how long will it be until we have none left to cut?"

Governor Brooks, of Wyoming, arose to ask the speaker if the work of reforestation done in New York is not entirely under the supervision of the State Forestry Association; and Mr. Whipple replied that such was the case, stating that the New York State Forestry Service has been in existence eighteen years. Governor Brooks asked if it was not a fact that in the Adirondacks many sections have already been cut over three different times; and Mr. Whipple answered that no section in New York had been cut over three times, although some have been cut over twice. Governor Brooks stated that he was under the impression that in the reports of the New York State Forest Commission, issued during Governor Flower's administration, it was stated that certain sections of the Adirondacks had been cut over three times, trees cut being twelve inches and upward in diameter. To this Mr. Whipple replied: "Every green tree on the slopes of the Hudson of twelve inches, or eight inches, or three inches, has been cut, and throughout that entire area erosion is taking place to-day. It has not been cut over three times because after the first and second cuttings nothing was left to cut." Mr. Whipple continued by calling attention to the fact that natural re-seeding of cone trees in American will never be a commercial success. He stated that the hardwoods will re-seed successfully, but artificial propagation of cone bearing trees is a necessity, because of the fact that the planted tree or the transplanted tree will grow in height twice as fast as the tree naturally re-seeded in the forest, this being due to the larger root growth secured with every transplantation. From the commercial side alone, he said, the business of raising coniferous trees is the most profitable

in the whole forestry proposition, as it will pay twice compound interest to any one who will invest his money in it.

Mr. Whipple concluded with the suggestion, which was received with distinct appreciation, that every state in the Union place on its statute books a law exempting from taxation the land dedicated to tree raising.

Hon. John F. Fort, Governor of New Jersey, followed Mr. Whipple with a statement in regard to New Jersey's forestry work. Governor Fort said that New Jersey has purchased within the last three or four years 10,000 acres of land to be maintained as state forest reserves. The New Jersey legislature this year appropriated \$25,000 for the work of the Forestry Commission, and it is the state's intention to purchase from 5,000 to 6,000 acres of land this year, to be added to the previously acquired reserves.

An agreement between state and townships has been made, whereby the townships in which these acquired forest reserves are located, are paid two cents an acre on their taxes from the State Treasury for every acre of taxable land acquired by the state.

Another thing that has been done in New Jersey, Governor Fort said, is the establishing of fire lines along all the railways of the state. A line, ten feet wide, 100 feet from either side of the track is provided for, and it is also provided that persons who will not allow the State to establish such fire lines through forest lands privately owned, shall not have any action against railroads for damages by fire. Where permission is granted to establish fire lines, individuals have their remedy, as now, in case fires occur.

Governor Fort concluded by saying that New Jersey proposes to go on in the work of reforestation and forest conservation, with the intention of making the State Forests playgrounds, as well as sources of profit, for the people of New Jersey and of the United States.

Governor Woodruff, of Connecticut, then introduced Dr. Arthur D. Hadley, President of Yale University, who spoke briefly on the work of the Yale Forestry School. Dr. Hadley said:

"When we first started our forestry school at Yale, eight years ago, things looked darker than they look now. It did not seem as though there was any interest in forestry at all. We worked with Mr. Pinchot, here in Washington, and, acting under his advice, developed a school which should not only teach forest botany, but which should teach forest economy, and forest economy adapted to American conditions. (Applause.) Our fear in the establishment of that school was that there would not be demand enough for the graduates. The numbers have increased until now we are sending out each year from thirty to forty men, trained in the actual business conditions of American forestry, besides giving instruction in summer to a large number of practical forest men in certain of the theoretical parts of the work.

"The growth of demand for these men has been so unexpectedly rapid that I feel sure, if this assembly can manage to tide over the dangerous time of the next twenty years, that after that the thing will take care of itself. The people will get such new conceptions of forestry and the demand for lumber, that, on mere business ground, forest preservation, in expert hands, will take care of itself, as a matter of course. But just now it is for an assembly like this to make the demand, before we reach the dead line, instead of waiting until that comes.

"How can we do it? First, by working in our own state in the way that the Governors in their speeches, and the delegates in their speeches, have shown, and still more, I think, by putting pressure on the National Government in favor of the extension of forest reservation in every possible way. (Applause.) Powerful as we are in our own states, an assembly like this, called by the President, is yet more powerful in carrying the public opinion of the country with it; and we stand here for the principle that our Government should not be a Government for the partial interest of the country, not even a Government for the important interests of the country, but a Government for the permanent interests of the country. (Applause.)

"Second, we have it in our power also, as has been suggested, to make intelligent forestry by individuals more profitable than it is to-day. (Applause.) Suggestions have been made regarding possible tax laws. I shall not try to repeat them. But by the appointment of committees, by the exchange of expert opinions, a body like this can make a great many things that do not quite

pay to-day, and yet are overwhelmingly for the public interest, pay five or ten years hence.

"I believe, gentlemen, that you have it in your power to put this great national work where, twenty years hence, it will take care of itself." (Applause.)

Hon. Robert B. Glenn, Governor of North Carolina, followed Dr. Hadley with an address that wrought the Conference up to a pitch of enthusiasm such as had not been reached through the entire two days' sessions. Governor Glenn's reference to the bills pending in Congress, providing for the establishment of a forest reserve in the Southern Appalachians, were punctuated with crashes of hand-clapping that fairly rattled the chandeliers. He said:

"Mr. President, Governors, and gentlemen of the Conference: In the language of one of the greatest sages and statesmen of this Union, Grover Cleveland (applause), 'a condition and not a theory confronts us to-day.' We have heard from the very able paper of the strong and patriotic President of the United States (great applause) something as to our duty in conserving our resources; and we have heard from the papers of Mr. Carnegie and Mr. Hill that something must be done to preserve the natural resources of this great Union in which we live.

"Now, Mr. President, what has caused the present condition? If you have listened to the papers that have been read you have learned that our forests are being denuded; our water powers are becoming exhausted; our land is being washed away and made worthless; our harbors are filling up; our commerce is being paralyzed; and something must be done to stop this waste, to stop this extravagance and to bring forward a remedy that will enable this great Nation to go forward as it has never done in the past.

"What is the most serious of all these terrible conditions confronting our people to-day? I can answer almost in one word. It is the failure of the people throughout the states to protect the great forest resources of the land in which we live. (Applause.) This is the source and cause of all these other ills of which I have just spoken. The people have been regardless of the future, only living for the present, thinking of themselves and not of their children and their children's children that are going to come after them, as all patriots should think. Vandals are going into our forests and denuding and destroying them, and their hands must be stayed. Vandalism

must be stopped; there must be an end to this waste, or else there can be no hope for our soil throughout the length and breadth of this Nation.

"For this existing condition there must be some remedy; but where must this remedy come from? It must come alike from the states and the Nation, state going hand in hand with state, and the states joining with the Nation. (Applause.)

"Last night at a banquet given to the Governors of this great Nation of ours Speaker Cannon said the township commenced, then the county, then the state, and then came a call upon the Nation for help and succor. The townships of the various states have already acted. We are cleaning out our little creeks and rivers, stopping the waste all we can by indictment and otherwise; we are trying to protect our resources as best we can, but the great arm of the Nation must be used to aid the people of this great section in which we live. (Applause.) A state can control intra-state commerce, but a state is powerless to control inter-state commerce. A state can control intra-state destruction, but a state is powerless to control inter-state destruction. Therefore we must have some means by which we can be brought together, and by which the Government and the states may go hand in hand—to prevent the devastation and the destruction now going on.

"There is a bill now pending in Congress which would bring about this remedy (applause), and I say to the members of the Senate and to the members of the House of Representatives that if they will only pass that bill every state government from Maine to Texas and to the great Pacific Coast will co-operate with this Government in bringing about a condition of things that will build up the great Nation in which we live to-day. (Great applause.)

"We have come before these men from 1899 up to the present time. Five or six times, representing my state, have I been here and knocked at the door of Congress, asking for relief. Each time they said 'next session,' and 'next session,' and 'next session.' When is the next session to come, Mr. President? (Laughter and applause.) Will they wait until all the forests are denuded, until all the rivers are dried up, until commerce is paralyzed? Then we do not want their help. We want it now, and must have it.

"I want to say to this great Convention that it does seem to me that a resolution ought to be passed by this Convention, indorsed by every Governor of every state present, calling upon this present Congress to wait no longer, but even in the short session yet remaining, to pass this bill that means so much to the peace, happiness, wealth, power and glory of this great Nation in which we live. (Great applause.)

"*Vox Dei* is calling for the preservation of the forests for humanity's sake, for

health's sake. *Vox populi* is calling for the prevention of this waste for manufacturing purposes, for electrical purposes, for dam purposes, for commercial purposes—for all



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CONFERENCE CHAIRMEN

**Govs. Noel, Dineen and Johnson
Secretary Shipp at center in rear**

of these purposes. And *vox Dei* and *vox populi* together shall be heard, and must be heard, or else we will get a tribunal that will listen to the demand of this great American Nation, as year after year we come here, urging our members to do their duty to the great land in which we live today. (Great applause.)

"Men, Governors, Governors of the great West, our members have stood by you in your forest preservation; we have stood by you in your irrigation acts (applause); we have stood by you in every single thing for the upbuilding and the glory of this great Nation in which we live. And coming today, voicing the people's voice, the voice of Maine, New Hampshire, Rhode Island, Connecticut, Massachusetts; voicing the sentiment of Pennsylvania, West Virginia, Virginia, North Carolina, Tennessee, South Carolina, Georgia, Alabama, Mississippi, I plead with you and beg of you to come to our relief and join with us in helping to save the country from this waste and devastation. We will plant our crops, we will plant our grasses; but, sir, as long as floods continue to come tearing and rushing down our steep, unforested heights, into the val-

leys and rivers, the crops which we may plant are absolutely worthless.

"In conclusion, I want to answer one remark of Speaker Cannon, and that was this—that there ought to be confederation in the White Mountains, and in the Appalachian chain, and that we ought not to ask help of the Union—that confederation ought to be the means by which this waste is to be stopped.

"I cannot answer for New Hampshire or Rhode Island or Massachusetts, but I can answer for the South. We tried confederation once, and it did not pay (great applause). You told us to come into the Union, and then to ask for anything we wanted; and now that we have come into the Union, and make our request, do not rebuff us the first time we come and ask you for relief. (Great applause.)

"Thank God, as was said yesterday, that there is no North, no South, no East, no West. A Confederate son and soldier stands before you, who would die for his country and his state because he loves it. And that Confederate soldier is just as true to the Union as any man born in the North could possibly be." (Great applause.)

Following Governor Glenn, Hon. James O. Davidson, Governor of Wisconsin, spoke along the same lines. He said that to no state in the Union is the question of conservation of natural resources more vitally important than to the state of Wisconsin. Only a few decades ago, he said, the northern and eastern parts of Wisconsin were one broad forest, broken only by occasional stretches of prairie land. Pine, hemlock, oak, and maple grew in such abundance that it was the state's proud boast that Wisconsin alone could supply the whole country with timber for a century. Amid its great forests were swamps and hundreds of small lakes, from which deep, swift streams rushed to form the rivers that added their volume to the Mississippi. But, with its great forest wealth and its immense water power, Wisconsin, like its sister states, lived only in the immediate present.

"Great lumber companies," said Governor Davidson, "inspired only by an enthusiasm and a greed which knew no bounds, attacked these forests, engaging in a mad race each to strip its territory, to market its lumber first, and then to move forward and continue the destruction. No tree was regarded as too small to escape cutting. Trunks six inches in diameter were cut for

lumber. Millions of young trees and saplings, which were too small to have any commercial value, were crushed by falling timber, or were cut to make room for log-



SOUTHERN YELLOW PINE

**Native to the Region of the Proposed
Southern Appalachian Forest**

ging roads. Those that escaped the ax of the loggers fell victims to forest fires, the destruction by which can only be counted by the millions of dollars—a further melancholy evidence of the carelessness with which our forests tracts were guarded.

"To-day we are beginning to feel the penalty for this indifference. Our proud position as the greatest timber state of the Union has passed to others. Thousands of acres of land of no value for agriculture have been rendered bare and practically worthless; our swamps are drying up, and as a consequence many of our streams have shrunk to but a small proportion of their former size. The destruction of our forests has taken from us that great regulator of the streams, for with no forests to protect the head water of rivers and to detain the water upon the soil, we have frequent freshets and floods and are confronted with the problem of dealing with rapidly rising and falling stream volume—a condition which has already rendered many of our

one time valuable water powers practically worthless.

"Wisconsin has, however, awakened to its duty to the public; it created the first state forest commission ever appointed by any of the states, and this commission has already developed into a Board whose labors are characterized by a continuous and progressive policy of forest administration. Vast tracts of public lands have been made into state forest reserves. Agriculturally profitable land has been sold and the proceeds used to extend the resources in less fertile soil. The United States Government has added a large tract, aimed to protect the head waters of our large rivers; while lumber companies, at last recognizing the state's wise policy, have dedicated several thousand acres to the forest reserves. Wisconsin has acquired over 300,000 acres, and this acreage is constantly being extended. It has been the policy to concentrate these holdings in counties having the greatest number of lakes feeding into large streams, and in some counties the state now holds ten per cent of the entire land area.

"For the further protection of its water powers, the legislature has authorized corporations to erect series of reservoirs on certain streams, thus producing a uniform water flow throughout the season. The location of such reservoirs and dams, the height of dams, the amount of land which shall be overflowed, and the time and manner in which the stored water shall be released, is determined by the State Board of Forestry; and the law also provides that holders of such storage reservoirs shall be permitted to charge reasonable tolls for water used, provided a certain previously agreed upon storage capacity is realized—such tolls not to exceed a net annual return of 6 per cent on the cash capital actually paid in. The capital of companies such as these, and the rates charged, are under the strict regulation and supervision of the State Railroad Commission.

"Forestry is a new science in America, and no country has greater need for the adoption of its teachings. The state and National Governments still possess millions of acres of rich forests, a part of which should be preserved for the benefit of future generations. The public forests must be protected for the benefit of the public, enlarged as conditions permit. When timber shall have ceased to be possible for fuel purposes, when coal beds have approached exhaustion, it is in our great forest tracts that we will find conservators of the substitute for fuel—water power—and, in addition, such forest tracts will rank as a most prolific source of public revenue."

Upon motion of Governor Folk, the morning session then adjourned.

AFTERNOON SESSION

At the opening of the afternoon session, former Governor Pardee, of California, addressed the Conference. Dr. Pardee had prepared a paper in advance, but on taking the platform he stated that he had consigned his written remarks to his pocket, and that his talk would be purely extemporaneous.

Dr. Pardee stated that on his trip to Washington from California he could not help noticing that the same conditions exist clear across the country; that forests are disappearing, mines are being exhausted, rivers that are naturally great arteries of commerce are deserted, their surface practically unrippled by the wheels of steamboats, and that none of the states which he crossed on his journey seemed to be taking any steps to correct this condition. He stated that Mr. James J. Hill recently told the country that five billion dollars would be required to put the country's railroads into shape to handle all the business that is offered them, and if the population and the business of the country increases in the future as rapidly as it has in the past, that five billion dollars will not do the work. And yet, he said, experts say that one half a billion (\$500,000,000) will put the waterways and the harbors of the country in a condition to handle the excess of the country's commerce.

Continuing, Dr. Pardee said:

"Here before me I see the Governors of almost all the states of the Union. Here in the capital of the Nation sits the Nation's Congress, within reach of your voices, within a few minutes' walk, within five minutes on the cars, by which you can go and tell these legislators what we desire and what the people of this country ought to have, and must have. (Applause.) I notice the instantaneous applause which greets every reference to the country's inland waterways, and I take it that you agree with me that, first of all, the waterways should be preserved. In order to do that the forests must be taken care of, and, as you have been told so many times to-day and yesterday, and will be told to-morrow, the care of our forests is the thing upon which all our

deliberations and all the things we are here to discuss absolutely depend. (Applause.)

"Here, on the platform, five or six pictures will be shown within the next five minutes. These pictures represent the work of the Reclamation Service in the West and Southwest. Out there dams are being built to store the waters of the rivers, so that water may be turned upon the millions of acres of arid and semi-arid lands, where, in time to come, the great civilization of this land, and therefore of the world, will be congregated. There, upon a few irrigated acres, a family of American children may be raised and given the benefit of both country and urban civilization. The time is near when the American people, instead of demanding 160 acres, will be, and must be, content with a much smaller acreage; and it is the work of the Reclamation Service that will bring this about. I am told that the Service has already opened waterways and ditches, which, if joined end to end, would reach from San Francisco to Denver. (Applause.) And yet they have only made a beginning. (Applause.)

"Gentlemen, is not the time for talking gone by? Has not the time arrived when the representatives of 80,000,000 people here assembled shall show to Congress and to the people of the country that we must have the things which we are here discussing? (Applause.) That we must have the forests renewed, must have the inland waterways preserved, deepened and made capable of taking care of the country's growing commerce? (Applause.) Must have the arid and semi-arid West and Southwest taken care of, for the overflow of the agricultural population which is now heading, I am alarmed to say, too much to the cities—must have all these things taken care of in a wise and beneficent way? (Loud applause and cheers.)

"Perhaps it would be revolutionary; perhaps it might not be the thing to do; but if I were a governor instead of an ex-governor, I would suggest that my colleagues from the various states meet with the Committee on Agriculture of the House of Representatives, and show that Committee, by the presence of the Governors of forty-four states, that what this Conference talks about it means, and what it means it wants, and what it wants, it ought to have. (Applause and cheers.)

"We have a way of doing things in California. My native city, but two years ago swept by the flames of a great conflagration, lay prostrate in the dust; but within those two years it has almost rehabilitated itself. Here are forty-four Governors who can take themselves to Congress and by their presence and influence have Congress rehabilitate the natural resources of the country, which have been so shamefully laid waste." (Loud applause.)

At the conclusion of Dr. Pardee's talk Governor Deneen of Illinois, took the chair, President Roosevelt retiring.

A paper prepared by H. A. Jastro, of Bakersfield, Cal., president of the American National Live Stock Association, was read by Mr. William C. Barnes, Mr. Jastro having been taken suddenly ill and being unable to deliver the address himself.

Mr. Jastro's paper was confined in the main to grazing and stock raising conditions in New Mexico, Arizona, and California. In that region, it was stated, there are at present over 8,000,000 head of sheep, nearly 3,000,000 head of cattle, and about 700,000 head of horses and mules, the gross estimated value of which is over \$100,000,000. This live stock is supported almost wholly upon the open grazing lands in the region mentioned, the grazing area being about 135,000,000 acres. This range, it was stated, is fast being destroyed by unwise and indiscriminate use and abuse. The only exception to this statement that can be noted is on the lands which have been withdrawn for purposes of forest protection, and on such lands a wise and efficient system of management is rapidly and almost miraculously restoring former splendid grazing conditions.

Mr. Jastro's paper referred to the stories of range wars and feuds that are said to have existed between cattle and sheep men from the beginning of grazing on the open range; and reference was also made to the disastrous conditions that have come about through over-grazing and over-stocking the range, resulting in the trampling out and practical extinction of many of the native forage plants.

Referring to conditions governing water supplies, it was stated that it is beyond contradiction that forested slopes surrounding the head waters of streams exert a tremendous influence in equalizing stream flow throughout the year, and thus provide ample irrigation waters during the summer months. The extension of forest re-

serves, and an intelligent conservation of wooded, brushy slopes, has already saved thousands of dollars to the stockmen and the irrigation farmers of the arid and semi-arid regions, he said, and the good results that can be attained by methods such as are followed by the Forest Service and the Reclamation Service can only be measured by the extent of the new work which these Services are enabled to complete.

Mr. Jastro's paper closed with the statement that the entire situation in the arid regions can, at present, best be dealt with by the General Government, and, referring again to grazing conditions, the statement was made that unless a just and equitable law is promptly passed, authorizing Federal protection and control of the public grazing lands, the native grasses will soon be completely trampled out through over-stocking, and hence the beneficial use of such lands by stockmen for grazing purposes will be very materially curtailed.

Hon. Joseph W. Folk, Governor of Missouri, then addressed the Conference, making the initial suggestion that resulted in the inauguration of the movement to form a permanent organization of the Governors.

Governor Folk declared that the Conference would be world-wide in its influence. He said that at no time in the Nation's history would it have been possible for so many Governors to meet together. Prior to the Civil War, he said, transportation facilities were inadequate; and after the war the sectional feeling for so long a time was such as to make a meeting of this kind impossible. "But now," he said, "we have met here together as members of one large family. In looking at the map, I have been impressed with the fact that the states of this Union are, after all, closely connected by blood and in interest. Tennessee, my native state, is largely made up of people from North Carolina and Virginia; Missouri, my adopted state, composed largely of Kentuckians,

Tennesseeans and Virginians; Texas, made up, in the main, of Missourians and Tennesseeans, and Oklahoma, whose citizens are principally Texans and Kansans. And so it is, all over this broad land; our American states are united by blood, united in purpose, and joined together by patriotic bonds to a common country. (Applause.) It does not matter so much where a man is from as what that man is. In Kipling's words:

"There is neither East or West—
Border, nor breed, nor birth—
When two strong men stand face to face,
Though they come from the ends of the
earth."

After referring briefly to the situation in Missouri as regards coal, iron and other minerals, Governor Folk aroused a tremendous burst of applause by the declaration that "the forestry question is our problem, and it is a problem that we must settle, and settle soon. The waterways question is our problem, and if we do not settle it we will fail of our duty, not only to the present generation, but to those who may come after us."

Continuing in this vein, the Missouri Executive said:

"Governor Glenn this morning spoke of a bill before Congress in reference to forests and waterways. I want to indorse what Governor Glenn said. That bill ought to pass. (Applause.) Governor Glenn spoke of *vox populi, vox Dei*. But there is a new voice in the land—a voice that was not contemplated by the Fathers of this Republic—*vox Cannoni*. (Applause and laughter.) This later voice has often proven more powerful than *vox populi*, and it sometimes seems that it has been thought greater than *vox Dei*.

"We want to put our forests in proper condition to preserve the timber we have, and we want to adopt a comprehensive scheme of reforestation. I am sorry to say that in Missouri we have no State Forester; but as soon as I go back home I intend to appoint a State Forestry Commission. (Applause and cries of "Good! good!") I believe that every Governor ought to do the same thing, and I am sure that every legislature, when it meets, will ratify such action. We want to preserve our forests. I hope I am not treading on forbidden ground, but I have been wondering why, with the necessity for forest preservation, it would not be

a good thing to put lumber on the free list. (Great applause.) I hope this is not heresy. It seems to me that, for every foot of lumber brought to us from another country we preserve a foot of lumber in our own forests." (Applause.)

Governor Folk then turned to the subject of improvement of inland waterways. He referred to the Missouri River, stretching clear across his state. As it is a navigable stream, he said, it belongs to the Federal Government. The states, he said, cannot undertake the work of improving such streams without obtaining the consent of the Government. If the Government does not care to undertake the permanent improvement of the Missouri River, he went on, and if the consent of the Government is granted, Missouri is willing to undertake the work, provided that, by act of Congress, Missouri is given the right to use the water power generated by the river. Applause followed his announcement that Missouri would undertake to do this work and to pay for it out of the revenues derived from the sale of the water power; and not only that, but to run the state government out of such revenues also. And, he stated, he believed that every state through which courses a navigable stream could and would undertake the same work, under similar conditions.

Governor Folk was followed by Governor Osborne, of Michigan, whose announcement that the Senate Committee on Interstate Commerce had favorably reported the bill for the perpetuation of the Inland Waterways Commission brought forth a round of cheers and hand-clapping. Practical results, stated Governor Osborne, were expected from the Conference; and among the practical results already obtained were the announcements by Governor Folk and others that they intended immediately to appoint State Forestry Commissions; and he pleaded for the same action on the part of every Governor present whose state has not already such a Commission.

Governor Cutler, of Utah, then spoke. He said that Utah has at pres-

ent eighteen National Forests, with a total area of 7,415,832 acres, and that it was estimated that in addition to this it would be well to place under Government supervision about 1,500,000 acres of forest lands, all of the forested areas, he said, lying high up in the mountains. About one-half of this latter 1,500,000 acres, he stated, is privately owned, and cannot be obtained by the Government except by purchase. He stated that it is the experience of every one in Utah that, from every point of view, it is desirable that the forest reserves be kept intact. Reforestation, to remedy the devastation wrought in former years by disastrous forest fires, is going on in Utah, he stated, adding that he understood that the Government nurseries of Utah have now over two and a half millions of seedling trees that will be ready for transplanting next year.

In view of the fact that Utah is a state wherein exist very extensive grazing and stock-raising interests, Governor Cutler's advocacy of a law for range regulation was most interesting. He stated that the question of grazing is a vexed one, but that he believes it would be well to restrict the number of head of live stock to be grazed on the ranges and in the National Forests to the actual carrying capacity of such ranges, and that if this is done the ranges, etc., will be maintained in their present good condition. Some measure such as that introduced last winter by Senator Burkett, of Nebraska, providing for Federal supervision of the range, and the establishment of a leasing system, would, he thought, bring about nothing but beneficial results.

Governor Cutler referred to the work of the Reclamation Service on the Strawberry Project, in Utah, saying that he was convinced, after a recent visit to this project, of the wisdom of entrusting such works to the Government. The Strawberry Project will, he said, reclaim 60,000 acres of land, at a cost of about \$40 an acre, but making the land worth over

\$100 per acre; and he said he considered this a good investment. He referred to the efforts of President Roosevelt to save from vandalism the scenic marvels of Utah, by setting aside the land surrounding the three great natural bridges of the State as National Parks, these lands containing also ruins of cliff-dwellers' houses, and canyon walls covered with the hieroglyphic picture-writing of the extinct, unknown races that once peopled the western country. Summing up, he said that it is the laudable desire of President Roosevelt and his associates to do everything possible in the way of conserving those natural resources the country possesses, for the benefit not only of the people who now enjoy them, but also for the generations yet unborn, and he concluded with the declaration that, so far as he was concerned, he intends to give his loyal support in the undertaking.

Governor Gooding, of Idaho, and Governor Norris, of Montana, in brief talks that bristled with figures and coruscated with Western enthusiasm, told of the work that is being done in their States toward reclaiming desert and arid lands. Both spoke of the work of the Reclamation Service in the highest terms; both declared, however, that the work being done by the states, under the Carey Act, was far greater in amount and value than the work of the Government. The plea of both speakers was for the adoption of some plan whereby the states themselves could carry on the work of forest conservation, reclamation, etc., unhindered by the Government. Governor Norris added to the enthusiasm of the session by declaring that he intended to follow the example of Governor Folk and appoint a State Forestry Commission immediately upon his return home.

Dr. James, president of the University of Illinois, told the Conference that the statesmen of the country, from President Roosevelt on through the list, are today taking up and incorporating into the political economy

of the Nation ideas that were advocated by men of science thirty years ago. It was his optimistic opinion, however, that no such waste as had been alluded to by previous speakers had existed in this country; or, if it did exist, it was not really waste, but the simple methods that, instinctively adopted by the early settlers of the country, had proven themselves in the main correct. He said that the fact that farms of the East have passed out of cultivation is not necessarily an indication that those farms have lost their productive power, but, rather, that they have been abandoned because of the opening up of broader fields of usefulness in the regions beyond the Mississippi and the Missouri, and he said he believed that, after all is said and done, the greatest natural resources the country possesses is not its forests, its rivers, its mines or its soil, but in the brains of its people.

Hon. James R. Garfield, Secretary of the Interior, was called upon for a talk, and responded in a manner that drew from the conferees repeated expressions of approval.

Secretary Garfield said that it is only within recent years that the Nation has felt the need of extending, by means other than those nature gave us, the areas where men could build homes. Such necessity, he said, has now arisen; lands that can be farmed, if water for irrigation can be supplied, are being given this water, and the cultivable area of the western states is rapidly being enlarged, this enlargement necessarily tending to wipe out, for some purposes, the boundaries between states. Such obliteration of state lines does not, however, mean that the states are going to lose any of their inherent rights.

Referring to the question of forest reserves in the West, Secretary Garfield said:

"It has been suggested that in the Western forest reserves that which has been attempted by the Federal Government may not be along the right lines. We do not for a moment maintain that the final word has

been said, that the ideal law has been passed, or that the regulations adopted cannot be improved. In regard to the question put by the Governor of Montana—I believe, something to this effect: 'Why should the Federal Government charge in the forest reserves those people who are using the forests; why should not the work in the reserves be paid for by the Government as a whole, rather than by the imposition of charges upon those who use the reserves?'—I will answer that question with another: Why should a great resource, which is owned by the people at large, be used by private interests, by somebody who is looking only to his own benefit, and not the benefit to the people of the whole country? (Applause.) That applies not only in the forest reserves, so far as grazing is concerned, but it applies equally well to the use of the water powers of this country, (Applause), first, in the conservation, and then in the use of such water powers. (Applause.)

"The people as a whole own these natural resources and it is for them to determine whether the resources shall be used for the benefit of all, or be turned over to be used without regulation for the benefit of whoever may happen first to get a foothold in any special locality." (Applause.)

Secretary Garfield said that as he listened to the addresses, he had reached the conclusion that the keynote was practically the same throughout—that it was simply a question as to how we can best work out the problems that confront us. He stated that his idea of conservation was the highest possible development, year by year, to meet the needs of the country's growing population; such development to be for the people as a whole, and not for the enrichment, by monopolization, of individual or corporate private interests.

Professor Burnett, director of the Nebraska Agriculture Experiment Station, was the next speaker, his address dealing with the topics of soil conservation, the extension of scientific methods of cultivation, and the determination of crops that may profitably be grown under what would ordinarily be considered unfavorable conditions. He made a plea for the extension of agricultural education in all of the states in order that the natural resources of the farm may be built up through intelligent handling of the soil.

Mr. W. S. Harvey, of Philadelphia, designated as representative of the American Forestry Association by the Association's president, Hon. James Wilson, spoke on behalf of the American Forestry Association, the Committee on Forestry and Irrigation of the National Board of Trade, and the State of Pennsylvania. He paid a deserved tribute to Mr. Wilson and Mr. Pinchot, stating that he has drawn his inspiration for the protection and intelligent use of the forests and waterways from these two men.

He stated that the Forestry and Irrigation Committee of the National Board of Trade in January, 1906, made a report to Congress embodying information gathered by the Committee from the General Land Office. The Committee was advocating the repeal of the Timber and Stone Act.

He said that under this act 5,000,000 acres of the most valuable timber land belonging to the United States was sold from 1901 to 1906 at the rate of \$2.50 an acre, and that thus, for \$13,000,000, the United States parted with lands actually worth more than \$100,000,000. The law that made this possible, he said, the National Board of Trade and the American Forestry Association has been trying to have repealed, but so far little headway has been made.

Mr. Harvey said that the State of Pennsylvania has acquired for State forest reserves 900,000 acres of land, and the State is planting this year 400,000 white pine seedlings. In the state reserves, Mr. Harvey said, sanitariums for the use of sufferers from tuberculosis were being established, the State having last year appropriated \$600,000 for such sanitariums. This he called special attention to as an admirable feature of the work that is being done by Pennsylvania.

Mr. Harvey read a copy of a dispatch sent on the 5th of May to Speaker, Cannon—"a cannon," he said, "that many of us wish might be spiked."—in regard to the forestry question:

"Forest reserves of the South and East are vital for the preservation and perpetuation of our waterways, for transportation and protection of cheap power, and essential to the extension of foreign trade, if we are to maintain the American wage level in competition with other manufacturing nations. The Leever Bill, I believe, is consistent with the Constitutional requirements of the House Judiciary Committee, and satisfactory to the friends of waterways and forests. Will you not exert your influence and power at this psychological time for a wise and perpetually beneficent cause that is earnestly advocated by more than fifty million Americans?"

The country, he said, knows what course Speaker Cannon chose to take.

He commented on the development of water power in the south and east that will be made possible by the establishment of national forests in the southern states and in the New England regions, saying that in the southern states alone development of the maximum possible water power would amount to a saving to the people of the Southern Appalachian and tributary regions of \$45,000,000 annually. He urged that Congress be petitioned so frequently and forcibly that it would be obliged to listen to the voice of the people in behalf of the preservation, conservation, and utilization of the country's great natural resources.

Governor Burke, of North Dakota, and Mr. W. G. Jones, of Texas, contributed to the general discussion, and at 5.25 o'clock P. M., on motion of Governor Noel, the session adjourned.

Following adjournment, and in pursuance of the suggestion made by Governor Folk, a number of the Governors met to take preliminary steps toward perfecting a permanent organization. About twenty Governors took part in this preliminary meeting, and before the meeting came to a close, "The House of Governors" had been launched. A meeting to be held in the coming autumn, either at St. Louis, or Chicago, was decided upon; Governor Swanson of Virginia, and Governor Willson of Kentucky, were chosen as the nucleus of an executive

committee and empowered to appoint five other Governors to act on the same committee; and this executive committee will hold a meeting during the early summer to elaborate further the plans for the first gathering of the new "House of Governors."

In commenting on this organization, Governor Folk, who stands as the father of the movement, said:

"One hundred years from now the House of Governors will be looked upon as one of the greatest factors in the Government and development of the United States. It will cement the states of the Union as they have never been cemented before. The value of the work that such an organization can do cannot be over-estimated. While the body will have no legal standing, and will, therefore, be in no position to dictate what laws shall, or shall not, be passed by the various legislatures, it is, nevertheless, true that recommendations made by the Governors would undoubtedly be enacted into law. In this way, many problems which now prove troublesome, would be solved. We could easily deal with uniform divorce laws, railroad legislation, and other such matters of interest outside the borders of any one state. There will be no conflict between the action of the Conference, in placing the power in the hands of the President to call the next meeting of

Governors to discuss the conservation of natural resources, and that of the committee which proposes to call a meeting of the Governors to discuss all matters of common interest. We will work in harmony, and our object is simply to broaden the scope of the work of the proposed meeting."

As has been stated, Governor Folk really stands as the sponsor for the new movement. He, and others among the Governors, felt that the proposition for assembling a conference of the Governors on call of the President left matters too indefinite; and it was also felt that such conferences as might be called by the President, while they might work efficiently toward handling problems of general conservation, would not feel like dealing with other problems, such as an organization like the House of Governors might wish to take up.

The matter of temporary organization was left in the hands of Governors Willson and Swanson, though it was regarded as practically settled that Governor Folk would be made a members of the permanent executive committee.

THIRD DAY'S SESSION

At the opening of the session of Friday, May 15th, Governor Blanchard read the report of the Committee on Resolutions. He stated that this report is not really in the form of a set of resolutions, but rather was designated to express the views and recommendations of the Conference.

"We, the Governors of the states and territories of the United States of America, in conference assembled, do hereby declare the conviction that the great prosperity of our country rests upon the abundant resources of the land chosen by our forefathers for their homes and where they laid the foundation for this great Nation.

"We look upon these resources as a heritage to make use of in establishing and promoting the comfort, prosperity, and happiness of the American people, but not to be wasted, deteriorated, or needlessly destroyed.

"We agree that our country's future is involved in this; that the great natural resources supply the material basis upon which our civilization must continue to de-

pend, and upon which the perpetuity of the Nation itself rests.

"We agree, in the light of facts brought to our knowledge and from information received from sources which we cannot doubt, that this material basis is threatened with exhaustion. Even as each succeeding generation, from the birth of the Nation, has performed its part in promoting the progress and development of the Republic, so do we in this generation recognize it as a high duty to perform our part, and this duty, in large degree, lies in the adoption of measures for the conservation of the natural wealth of the country.

"We declare our firm conviction that this conservation of our natural resources is a subject of transcendent importance, which should engage unremittingly the attention of the Nation, the states, and the people in earnest co-operation. These natural resources include the land on which we live, and which yields our food; the living waters which fertilize the soil, supply power, and form great avenues of commerce; the forests which yield the materials for our homes, prevent erosion of the soil, and conserve the navigation and other uses of our streams; and the minerals which form the

basis of our industrial life, and supply us with heat, light, and power.

"We agree that the land should be so used that erosion and soil wash should cease, that there should be reclamation of arid and semi-arid regions by means of irrigation; that the waters should be so conserved and used as to promote navigation, to enable the arid regions to be reclaimed by irrigation, and to develop power in the interests of the people; that the forests, which regulate our rivers, support our industries, and promote the fertility and productivity of the soil, should be preserved and perpetuated; that the minerals found so abundantly beneath the surface should be so used as to prolong their utility; that the beauty, healthfulness, and habitability of our country should be preserved and increased; that the sources of national wealth exist for the benefit of the people, and that the monopoly thereof should not be tolerated.

"We commend the wise forethought of the President in sounding the note of warning as to the waste and exhaustion of the natural resources of the country, and signify our appreciation of his action in calling this Conference to consider the same, and to seek remedies therefor through co-operation of the Nation and the states.

"We agree that this co-operation should find expression in suitable action by the Congress within the limits of, and co-extension with the national jurisdiction of the subject, and, complementary thereto, by the legislatures of the several States within the limits of, and co-extensive with, their jurisdiction.

"We declare the conviction that in the use of the natural resources our independent States are interdependent and bound together by ties of mutual benefits, responsibilities, and duties.

"We agree in the wisdom of future conferences between the President, members of Congress, and the governors of the States on the conservation of our natural resources with the view of continued co-operation and action on the lines suggested. And to this end we advise that from time to time, as in his judgment may seem wise, the President call the governors of the states, members of Congress, and others into conference.

"We agree that further action is advisable to ascertain the present condition of our natural resources, and to promote the conservation of the same. And to that end we recommend the appointment by each State of a commission on the conservation of natural resources, to co-operate with each other and with any similar commission on behalf of the Federal Government.

"We urge the continuation and extension of forest policies adapted to secure the husbanding and removal of our diminishing timber supply, the prevention of soil erosion, the protection of headwaters, and the

maintenance of the purity and navigability of our streams. We recognize that the private ownership of forest lands entails responsibilities in the interests of all the people, and we favor the enactment of laws looking to the protection and replacement of privately owned forests.

"We recognize in our waters a most valuable asset of the people of the United States, and we recommend the enactment of laws looking to the conservation of water resources for irrigation, water supply, power, and navigation, to the end that navigable and other streams may be fully utilized for every purpose.

"We especially urge on the Federal Congress the immediate adoption of a wise, active, and thorough waterway policy, providing for the prompt improvement of our streams and conservation of their watersheds required for the uses of commerce and the protection of the interests of our people.

"We recommend the enactment of laws looking to the prevention of waste in the mining and extraction of coal, oil, gas, and other minerals with a view to their wise conservation for the use of the people, and to the protection of human life in the mines.

"Let us conserve the foundations of our prosperity.

"Respectfully submitted,
 "NEWTON C. BLANCHARD.
 "JOHN F. FORT.
 "J. O. DAVIDSON.
 "JOHN C. CUTLER.
 "M. F. ANSEL."

Commenting on this report, Governor Blanchard said that the Committee, while endeavoring to make its report broad, liberal, and of national scope, had tried also to limit its declarations to subjects concerning the conservation of natural resources. He said that he had long thought if the Governors of the several States could meet from time to time and exchange ideas on Governmental affairs and affairs of their states, much good would come of it. He said that the problems of conservation were proper subjects for the fullest co-operation between the states of the United State, and on his motion the resolutions were adopted.

Following this, Honorable William Jennings Bryan addressed the conference. He said, in part:

"I hesitate to speak at all, because the Governors who are assembled here repre-

sent constituencies, and those constituencies, well marked, are looking to them for the protection of state interests in conjunction with the development of National interests, and I recognize that a private citizen like myself with no fixed constituency (laughter and applause) speaks, if he speaks at all, either for himself or for a nebulous portion of the Nation. I recognize that such an one is not only under the same obligation that the Governors are, but that he speaks with less authority; and I have been anxious that those who were in official position should discuss these questions and leave to us unofficial visitors the bringing up of the rear end, so to speak, of the discussion. * * *

"I acknowledge my obligation to President Roosevelt for the opportunity which he has given me to participate in this meeting. The Conference marks the beginning of a new era, during which increasing attention will be given to the far-reaching problems involved in the conservation of the Nation's resources. (Applause.) The epoch-making speech with which the Chief Executive opened the first session must exert a powerful influence upon the country at large, as it has upon those who were fortunate enough to hear him. * * *

"I am a strict constructionist, if that means to believe that the Federal government is one of delegated powers and that constitutional limitations should be carefully observed. I am jealous of any encroachment upon the rights of the states, believing that the states are as indestructible as the union is indissoluble. It is, however, entirely consistent with this theory to believe, as I do believe, that it is just as imperative that the general government shall discharge the duties delegated to it, as it is that the states shall exercise the powers reserved to them.

"There is no twilight zone between the Nation and the State, in which exploiting interests can take refuge from both, (great applause), and my observation is that most—not all, but most—of the contentions over the line between Nation and state are traceable to predatory corporations which are trying to shield themselves from deserved punishment, or endeavoring to prevent needed restraining legislation. The first point which I desire to make is that earnest men, with an unselfish purpose and concerned only for the public good, will be able to agree upon legislation which will not only preserve for the future the inheritance which we have received from a bountiful Providence, but preserve it in such a way as to avoid the dangers of centralization. Nothing that is necessary is impossible; and it would be a reflection upon the intelligence, as well as upon the patriotism of our people, to doubt the value of gatherings of this kind. * * *

"I begin with the proposition that it should be our purpose, not only to pre-

serve the Nation's resources for future generations by reducing waste to a minimum, but that we should see to it that a few of the people do not monopolize that which is in equity the property of all the people. (Applause.) The earth belongs to each generation, and it is criminal to fetter future generations with perpetual franchises, making the multitude servants to a favored faction of the population, as it would be to impair, unnecessarily, the common store. (Applause.) I am glad that Secretary Garfield emphasized this point. It is one that must always be kept in mind by the Nation and by the several states. * * *

"I was surprised at the statistics given in regard to our coal and our iron ore. While it is possible that new coal measures and new ore beds may be discovered, we cannot afford to base our conduct upon speculations as to what may yet be discovered. We should begin an intelligent supervision and conservation of that which is known to exist, and I respectfully submit that it is worth while to ask ourselves whether we can afford to offer a bounty to those who are engaged in exhausting the supply of raw materials, which, when gone, cannot be replaced. Surely if there is any importation which we can properly encourage by a free list, it is the importation of those raw materials of which our own supply is limited. (Applause.) And what I say in regard to coal and iron ore is equally applicable to timber.

"It is hardly consistent to discourage the importation of lumber, while we worry about the devastation of our forests.

"Mr. Hill has rendered the Conference a real service in presenting the facts and statistics set forth in his address on land and its cultivation. Few of us, probably, were conscious of the impairment of the crop value of our soil. I am sure that a clear understanding of this subject will lead to a still further enlargement of the work of the Department of Agriculture and to still closer co-operation between the Department of Agriculture and the States in teaching economical methods of agriculture. (Applause.) Already the rapid growth of the agricultural college offers encouragement and I am glad to express my appreciation of the valuable work done by Secretary Wilson and his associates in bringing to our country fruits, plants and grasses suited to the different parts of our country. As the farmer pays more than his share of the taxes and receives less than his share of the direct benefits which flow from national appropriations, it is only justice to him that we shall be liberal in the support of every effort put forth for the improvement of agriculture. (Applause.)

"Irrigation has justified the arguments which led to the inauguration of the work. No one who has witnessed the transformation of the desert into field and gar-

den can doubt the wisdom of the steps that have been taken. Here, as elsewhere, both the Nation and the State can find a field for legitimate activity, and I am sure that there will be a continuation of this work until all of the waters which can be utilized for that purpose have been appropriated. * * *

"The same principle which was invoked in support of irrigation can be invoked in support of drainage. The question is not whether the water should be brought upon the land or taken off the land; it is whether the land shall be made tillable and its wealth-producing qualities utilized. Drainage of the swamps is, therefore, as legitimate a work as the reclamation of arid wastes.

"No subject has been brought out more prominently at this Conference than the subject of forestry, and it justifies the time devoted to it, for our timber lands touch our national interests at several points. Our use of lumber is enormous, but immense as would be the inconvenience and loss caused by the absence of lumber, the consequence of the destruction of our forests would be still more disastrous to the Nation. As has been shown, the timber on our mountain ranges protects our water supply. Not to speak of changes in climate which might follow the denuding of our mountains, the loss to the irrigated country could not be remedied and the damage to the streams could not be calculated. And if this is not enough to arouse the interest of all, I may add that the destruction of the forests, on the mountain ranges would in time impair the underflow upon which we rely for our well water.

"The good effects of this Conference are already apparent in the determination expressed by several governors at once to appoint Forestry Commissions and begin such work as the state can do. (Applause.) In this case action is so urgent and the field to be covered so large that both the Nation and the several states can exercise themselves to the full without danger of doing too much. (Applause.) The national reservations already made in the West, and the new reservations that ought to be made, and are likely to be made, in the White Mountains and in the Appalachian Range can doubtless be so administered as to protect national interests without unduly burdening the states in which the reservations are located, or needlessly interfering with the development of the states. No national policy need retard the development of the western states, and their own interest should restrain them from sacrificing future wealth and protection for temporary advantage.

"Lastly, I come to our interior waterways. I shall not defend the improvement of these waterways on the ground that such improvement would help to regulate the railroad rates, although it would aid regulation; for whenever the people are ready,

they will exercise the power which they have. But water traffic is less expensive than traffic by rail, and there are many commodities which can be transported much more cheaply by water than they possibly could be carried by land. I believe it has been estimated that an expenditure of \$500,000,000 on interior waterways would result in a saving of nearly \$200,000,000 annually.

Just a word in conclusion about an investment in permanent improvements. Money spent in care for the life and health of the people, in protecting the soil from erosion and from exhaustion, in preventing waste in the use of minerals of limited supply, in the reclamation of deserts and swamps, and in the preservation of forests still remaining and the planting of denuded tracts—money invested in these and in the development of waterways and in the deepening of harbors is an investment yielding an annual return. If any of these expenditures fail to bring a return at once the money expended is like a bequest to those who come after us. And as the parent lives for his child as well as for himself, so the good citizen provides for the future as well as for the present. This gathering will be remembered by future generations, because they as well as ourselves will be the recipients of the benefits which will flow from this Conference. We have all been strengthened by communion together; our vision has been enlarged and the enthusiasm here aroused will permeate every state and every community." (Great applause).

At the conclusion of Mr. Bryan's address, the peroration of which elicited tremendous bursts of applause, President Roosevelt stepped quickly across the platform and shook the Nebraskan heartily by the hand. When the enthusiasm had subsided, Judge Goudy, President of the National Irrigation Congress, invited all present to attend the sixteenth session of that organization at Albuquerque, New Mexico, September 29th to October 3d.

Hon. B. B. Comer, Governor of Alabama, was recognized and made a short talk, following the President's suggestion that those governors who had not been heard be called on for their contribution to the discussion. Governor Comer dwelt on the resources of Alabama and on the state's waterways, saying however, that his sentiments were much the same as those of Governor Folk, and that he hesitated to take a stand for turning

over the control of waterways and resources to the National Government.

President Roosevelt came into the discussion with a forcible statement along the lines brought out in the remarks of the different governors. Illustrating the stand taken by the Federal Government, the President said:

"My position has been simply that where a privilege, which may be of untold value in the future to the private individuals granted it, is asked from the Federal Government, the Federal Government shall put on the grant a condition that it shall not be a grant in perpetuity. (Applause.) Make it long enough that the corporation shall have an ample material reward. The corporation deserves it. Give an ample reward to the captain of industry, but not an indeterminate reward. (Applause.) Put in a provision that will enable our children at the end of a certain specified period, to say what, in their judgment, should be done with any great natural power which is of use to the grantee only because the people as a whole allow him to use it. It is eminently right that he should be allowed to make ample profit from his development of it, but make him pay something for the privilege, and make the grant for a fixed period, so that when the conditions change, as in all probability they will change, our children—the Nation of the future—shall have the right to determine the conditions upon which that privilege shall then be enjoyed. (Applause.)

"Where that policy can best be carried out by the states, carry it out by the states; where it can best be carried out by the Nation, carry it out by the Nation. My concern is not with the academic side of the question. My concern is in the employment either of the state rights or the principle of National sovereignty, as it will best conserve the needs of the people as a whole. (Applause and cheers.)

Hon. A. E. Mead, Governor of Washington, followed the President, and brought up a subject that had not before been mentioned—the conservation of the resources upon which a very important northwestern industry depends, the fisheries industry. He said that the salmon industry of the northwest is of tremendous importance to the people of that part of the United States, and he spoke for the enactment of laws that would protect that industry, both for the sake of the State of Washington and the territory of Alaska.

Hon. J. Frank Hanly, Governor of Indiana, followed with a series of interrogations, saying that they were submitted as an appeal for information along certain lines of conservation. He wanted to know if the program of conservation meant the imposition of limitations upon production of coal, lumber, etc., and asked, if this is the case, would it not mean putting limitations upon the industrial life of the Nation. He expressed his full sympathy with the purposes of the Conference, and stated that his remarks were made solely for the purpose of gaining information, and not in a spirit of opposition or criticism.

Hon. Augustus E. Willson, Governor of Kentucky, presented some facts in regard to the utilization of natural resources in his State. Referring to Mr. Mitchell's statement in regard to the loss of life attendant upon coal mining operations, he said that one of the big coal companies of Kentucky has produced in the last ten years 1,100,000 tons of coal with the loss of only one life. This coal company, he said, owns or controls great areas of land, and on its land the company, unaided, has planted 1,000,000 black walnut trees and a quarter of a million other trees.

He spoke of Kentucky's interest in the improvement of the country's waterways and said that no other State in the Union realized more fully the importance of a rational and practical development of a system of inland water transportation.

Hon. Edward W. Hoch, Governor of Kansas, expressed the interest of the Sunflower State in the problem of conserving and extending the nation's inland waterways. He said that he had been deeply impressed with the mutuality of interest which had developed in the Conference. "California," he said, "cannot say to Florida or to Colorado, 'we have no need of thee', and Maine cannot say to Texas, 'we have no need of thee'. We are mutual in interest, and this Conference has cemented our Union as nothing has ever done before."

Governor Sheldon, of Nebraska, spoke on the excellent work being done by the agricultural experiment stations in his State. He said that in Lancaster county, Nebraska, for the last five years, the yield of corn has been thirty-five bushels per acre. Yet the corn raised under the direction of the agricultural experiment station located in that county, under the same conditions and the same circumstances, but in accordance with the teachings of science, has yielded seventy-six bushels to the acre for the last five years. He said that these object lessons are something that the farmers of the country cannot argue down or get around; and he continued with a plea for the extension of this line of governmental work. Reforestation and the planting of new forests, he said, was also a vitally important work, and he urged that individual and State co-operation be given the National Government in its work along this line.

Lieut. Governor Davidson, of Texas, spoke on the natural resources of that State and urged the extension of a system of water conservation for irrigation and power purposes in the mountainous regions of western Texas. Mr. William Loudon, Iowa, spoke briefly in a general summing-up of the proceedings of the Conference; and

Mr. Bryan presented the following resolutions.

"Resolved: That this Conference records its deep regret that Ex-President Cleveland is prevented by sickness from participating in this historic meeting; and that, extending to him a cordial greeting, it expresses a sincere wish for his speedy recovery."

After a brief discussion, at the close of which it was decided to print the proceedings of the Conference in full, Governor Blanchard said:

"With profound appreciation of the great work that this Conference has accomplished, I do now move that the Conference adjourn sine die."

Before putting the motion, President Roosevelt said:

"Let me extend a word of thanks to all of you, to the Governors and the other guests for coming here. The White House has held many distinguished gatherings in its day. I do not believe it has ever held as distinguished a gathering as this, composed of executives and representatives of the executives of all of the States of the Union. I thank you for coming; and I can assure you that at least no body of guests has ever been more welcome than you have to the White House."

Thereupon, at 1:30 o'clock P. M., the Conference stood adjourned.

THE FOREST LESSON

By ARTHUR CHAPMAN

In order to reforest a part of the Adirondacks, it has been found necessary to import a million young trees from Germany.—Press Dispatch.

THE throb of the ax in the forest went on through a nation vast,
Like a fevered heart that is beating in measure that's all too fast;
We gave carte blanche to the woodman, and none stayed the vandal hand,
And now, to replant our forests, we must send to the Fatherland.

The sawmill shrieked in the mountains, and the sound was borne on the breeze,
O'er the crash of the falling giants as they splintered the smaller trees,
And all that was left was silence, where whispered the forests grand—
And now, to repair the mischief, we must send to the Fatherland.

We have gained some industrial captains—of lumber monarchs a few—
But somehow they don't quite balance the damage that such chaps do;
There's naught to make up for those barrens where wantonness set its brand,
In these days when for forest seedlings we must send to the Fatherland!

—Denver Republican.

IMPORTANT ANNOUNCEMENT

The American Forestry Association has recently written its members, urging their aid in securing what an enthusiastic member calls "short term educational subscriptions" to FORESTRY AND IRRIGATION—i.e., six months' subscriptions, at the rate of 25 cents each. The responses daily pouring into its offices have far exceeded its expectations. Members thus co-operating are cordially thanked, while those who have not replied are urged to do so.

As announced, the current issue of FORESTRY AND IRRIGATION is devoted to a report of the White House Conference. To find space, the size of type used has been reduced, and the number of pages increased twenty-five per cent.

That none desiring it may fail to receive a copy of this report, the forms are being held, that another edition

of the magazine may, if needed, be run off.

Trial subscribers should, in every case, receive the June number. Members, therefore, intending to comply with the request made of them in the letter above referred to, should act promptly.

Numbers soon to follow will treat of inland waterways, drainage, water-power, reclamation of arid lands, and other questions connected with the conservation of natural resources. In pushing its educational propaganda, the Association desires to avail itself fully of the deep and widespread interest aroused by the Governors' Conference. Members willing to aid its work can find no better time and no greater opportunity than that afforded by the great gathering so recently adjourned. Let the orders come.

THE DRAINAGE CONGRESS

THE friends of Federal aid to drainage have every reason to feel encouraged at the meeting held by the National Drainage Association in Washington on May 12 and 13. While the Congress was not so largely attended as had been hoped, this is accounted for by the Conference of the Governors, at the White House, and by other gatherings of scientific and professional men in the Capitol at the same time.

The several sessions were replete with general interest; some of the most pronounced advocates of Federal aid to drainage appeared before the Congress, and in no uncertain terms gave assurance to the members of their thorough conviction that the cause will ultimately triumph.

Among those speaking were Senator Clapp, of Minnesota, Senator Newlands, of Nevada, Representative Nelson Steenerson, of Minnesota, and Representative H. R. Burton, of Dela-

ware. Hon. William Jennings Bryan volunteered a most excellent talk, in which he assured the audience of his thorough belief in the cause of Federal aid through the reclamation of overflowed and swamp lands.

Under the call of states, every delegate was emphatic as to the absolute necessity, both from a commercial and a sanitary standpoint, for prompt action by Congress in this great work of internal improvement. There was a slight diversity of opinion as to the best methods of obtaining Congressional action; however, eleven-twelfths of all present were in favor of a bill such as has been formulated by the Secretary of the Interior, and which is known as the Flint Bill.

At all periods of the Congress the utmost harmony prevailed. Every delegate realized that the cause of Federal aid to drainage had made remarkable strides since the first meeting at Oklahoma City, in December, 1906.

It is proposed, during the summer, by the friends and advocates of National drainage, to carry on a vigorous educational campaign, to the end that not only members of Congress, but members of State Legislatures, as well as the people themselves, shall become fully alive to the absolute necessity of securing the passage of the much-needed legislation. It is thought

more than probable that in this work of education several speakers will be placed in the field, for the purpose of spreading the propaganda of "Draining the swamps for homes and health."

The Executive Committee did not determine the place or time of holding the next annual Congress; however, this question is now under advise-

CONSERVATION—WOMAN'S WORK

BY

Lydia Adams-Williams

FROM time immemorial when any great work is to be accomplished—any achievement which vitally concerns the life and the welfare of humanity, any uplift of the children of men in

Joan of Arc's patriotism and inspiration enabled the peasantry of France to throw off the yoke of English oppression. To Josephine's devotion to her husband and the cause nearest his heart belongs the credit for the victories of Napoleon. To the intuition of Isabella of Spain, to her tenacious grasp of a great idea, to her foresight and her divine sympathy the world is indebted for the discovery of a great continent, for the civilization we enjoy to-day and for the great wealth of resources, the development of which has made us the most powerful nation on the face of the earth.

And as it was the intuitive foresight of a woman which brought the light of civilization to a great continent, so, in great measure, will it fall to woman, in her power to educate public sentiment, to save from rapacious waste and complete exhaustion the resources upon which depend the welfare of the home, the children and the children's children.

This is the inevitable conclusion, for to woman has the practice of saving, of conserving, ever been a paramount issue.

Man has been too busy building railroads, constructing ships, engineering great projects, and exploiting vast commercial and financial enterprises, to take the time necessary to consider the problems which concern



Lydia Adams-Williams.

A writer and lecturer on Conservation, and who is the first woman to take up this work.

the home or in the broader field, the world—to woman's integrity, resourcefulness, genius and capacity for endurance has the final triumph been due.

the welfare of the home and the future.

That has been left for woman, and it is conclusively a field where her care and love and devotion to all that makes for the betterment of humanity will find ample scope for work.

Man has always been the maker of money, while to woman has fallen the province of being the saver of money. When the necessity of economy is felt in the home, woman bravely meets the emergency, and plans for and effects the necessary saving.

So in the great national crisis which now confronts us—the necessity for economizing and preserving our fast-disappearing resources for ourselves and our children—woman is found the willing and ready partner to carry on the work.

One has but to attend any gathering of representative women, in convention assembled, to learn that there is an overwhelming sentiment and a consensus of opinion in favor of preserving forests and conserving natural resources.

Many women's organizations have already placed themselves on record as in favor of preserving forests. The District of Columbia Federation of Women's Clubs, with its seventeen affiliated clubs and 4,000 members, was the first woman's organization to adopt resolutions, introduced by the writer on November 30, 1907, indorsing President Roosevelt's policy of conserving the natural resources; while the National Society of the Daughters of the American Revolution followed, a close second.

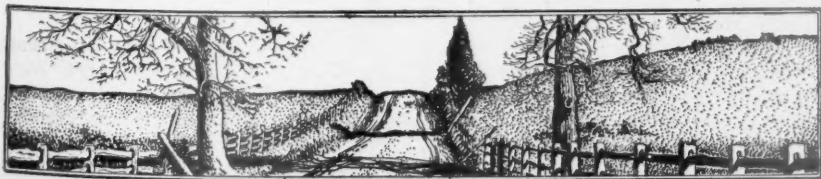
The General Federation of Women's Clubs, with its 800,000 workers and hundreds of state and local branches, has for several years made a

specialty of work for preserving the forests, upon which the proper conservation of all other natural resources depends. It is conceded that the almost universal sentiment in favor of preserving forests is due to the interest taken in the subject by the women's clubs and the work done by them.

The Conference of Governors on the natural resources, just closed at the White House, was honored by the presence of Mrs. Sarah S. Platt Decker, of Denver, Colo., president of the General Federation of Women's Clubs, whom President Roosevelt especially invited. The recognition thus accorded the women of the country by the President and the other great men of the Nation shows the trend of public opinion and gives evidence of the realization and appreciation of woman's ability along these lines. Mrs. Roosevelt was also an interested listener at the meetings.

The saving of the country's resources will be an assured fact when the women of the country earnestly devote themselves to that work. It is peculiarly woman's work, as the time is short, and as men are slow in action, even when knowing the facts.

Far-reaching results may be accomplished speedily by women educating the men of their families. Then by inculcating in their children the precepts of economy, and then impressing them with the patriotic duty of elevating the Nation to the highest plane of civilization, the entire sentiment of the Nation may be changed by the motherhood of the country in a single generation, and this people converted from the most wasteful and extravagant in the world to the most prudent and conservative.



EDITORIAL

Forestry and Irrigation First

The report of the White House Conference, practically complete, is contained in this issue of **FORESTRY AND IRRIGATION**; and this magazine is the first among periodicals to publish a full account of the meeting of the Governors. Almost the entire magazine is devoted to this report, and the papers, addresses, discussions, etc., are given in the order in which they occurred. Sixteen pages have been added to the magazine in order to do this; and even with such addition it has been found necessary to omit practically all other features, departments, etc., usually found in the magazine. None but papers actually read at the Conference appear in this issue; several extremely valuable ones not delivered because of lack of time, but which will appear in the published report of the proceedings, will be printed later in this magazine.

"A New Departure in Government"

The Governor's Conference has been well styled "a new departure in government." The states of the Union have grown in number from thirteen to forty-six. The Nation has risen from a position in which the governorship of a state or even the mayoralty of an important city was held as a higher dignity than membership in either branch of Congress. Yet never before, in the century and a quarter during which this development has been in progress, have representatives of the states and of the three co-ordinate branches of the National Government met together. As an innovation, if nothing else, the event might well be styled "epoch-making."

Such a coming together reflects strikingly the spirit of the age. This is an era of congresses, conventions, and great concourses. Modern facilities, notably railroads, telegraphs, and daily newspapers, are rapidly uni-

fying the world. For the first time in history it is now possible for men scattered over an area as great, almost, as that of Europe, to come together quickly and inexpensively, to confer, surrounded by "all the comforts of home," to keep in touch, meanwhile, with their ordinary interests, and to return promptly to their regular work. Hence, meetings of bodies, commercial, political, economic, educational, scientific, religious, philosophical, and what-not, are the order of the day. Thus, influenced by the Time Spirit, it was probably inevitable that representatives of all of the states should, sooner or later, be brought together in conference with representatives of the several branches of the Federal Government.

As a factor in developing the National spirit, as against the old time particularism which, once regnant, made the development of the Nation and a true National policy so difficult, such a meeting was doubtless potent. As a factor in developing uniform policies among multiplying and widely separated states, this meeting, with those to follow, may be even more potent. The individualism which so long characterized the American man, has likewise, in large measure, characterized the American state. State policy, state legislation, state administration, has hitherto been, in great degree, a matter of "every tub standing on its own bottom." The result has been divorce laws, labor laws, corporation laws, and the like, strikingly suggestive of a patchwork quilt. While, super-imposed upon this maze of dissimilar and inharmonious state legislation, has been still another system of Federal legislation, making the confusion worse confounded.

But the states are now learning what individuals earlier began to learn; namely, that their relations in a commonwealth are relations not of independence, but of interdependence. Further, as harmony and substantial

uniformity of policy among the business and other organizations mentioned has been found wise, so harmony and uniformity among the states will doubtless also gradually be found wise.

Though convening to consider a specific question, that, namely, of conservation of natural resources, it is noteworthy that the one conference held sees far beyond that single object. Governor Swanson, of Virginia, mentioned extradition, standardization of laws on marriage and divorce, taxation and police power as questions that should be considered at the next conference. The remarks of both President Roosevelt and Mr. Bryan are likewise suggestive of future possibilities with respect to corporation control. Speaking of the respective fields of state and Nation, the President said, "I am trying to find out where one or the other can act, so that there shall be some sovereign power that, on behalf of the people, can hold every big corporation, every big individual, to an accountability so that its, or his acts shall be beneficial to the people as a whole." While Mr. Bryan pointed out felicitously that there should be "no twilight zone" between the domains of state and Nation in which corporations may hide and escape control.

On reflection, it should be evident that if the people of the United States have seriously set themselves to work to control, through their various governments, National and state, their corporations and trusts, no better scheme could be devised than a conference representing all these governments and deliberately formulating a policy, legislative and administrative, whereby this end should be pursued. The familiar process of scudding from state to state, and of oscillating between state and federal jurisdictions, whereby, it is commonly believed, great interests have played hide-and-seek with justice, and snapped their fingers at Government, might, in this way, be seriously discouraged.

Again, the jealousy between state and Nation over the question of respective powers that has proved so serviceable to mighty lawbreakers could, by this method, be settled with the minimum of difficulty. The President declared that, as respects the "academic side of the question" of state and National functions, he cared nothing. "I deal," he said, "with the matter from the standpoint of true popular interest, and therefore my desire is to employ indifferently either the principle of states' rights, or the principle of National sovereignty, whichever in a given case will best conserve the needs of the people." With this view the Conference acquiesced, much to the disgust of at least one newspaper prominently identified with corporate interests. Obviously, when states and Nation cease disputing over which shall or shall not catch the hare, the prospect for catching it will materially improve.

That such conferences, meeting perhaps annually, in future may develop a legislative "third house" naturally suggests itself. This first conference did, in fact, urge action by Congress, as is shown by the following resolution:

"We especially urge on the Federal Congress the immediate adoption of a wise, active, and thorough waterway policy providing for the prompt improvement of our streams and conservation of their watersheds required for the uses of commerce, and the protection of the interests of our people."

Other recommendations, applicable to Congress, were also made.

Conceding the point, however, does it not afford ground for congratulation rather than for regret? The governors are nearer the people certainly than the upper, and probably than the lower house of Congress. Congressmen are in the National Capitol, most of them hundreds, many of them thousands of miles from their constituents. Governors are in their home states, in closest touch with public sentiment. Furthermore, the govern-

ors in conference can only recommend; and for whatever recommendations they may make, they are directly responsible to the voters in their respective states.

The extraordinary harmony of the Conference affords added ground for profound satisfaction. That men coming together from regions so remote and representing interests so multitudinous, diverse, and apparently conflicting should, for three days, have compared views, and concluded with practical unanimity of sentiment, not only testifies to the substantial oneness of the American people, but augurs well for the future of the Republic. The first Conference of Governors has proved an overwhelming success. We may well wish it "many happy returns."



Grants in Perpetuity

Among the most notable utterances made at the Governors' Conference is the following by President Roosevelt:

"My position has been simply that where a privilege which may be of untold value in the future to the private individuals granted it is asked from the Federal Government, that the Federal Government shall put on the grant a condition that it shall not be a grant in perpetuity. Make it long enough so that the corporation shall have an ample material reward. The corporation deserves it. Give an ample reward to the captain of industry, but not an indeterminate reward. Put on a provision that will enable our children at the end of a certain specified period to say what in their judgment should be done with that great natural power which is of use to the grantee only because the people as a whole allow him to use it. It is eminently right that he should be allowed to make ample profit from his development of it, but make him pay something for the privilege, and make the grant for a fixed period, so that when the conditions change, as in all probability they will change, our children—the Nation of the future—shall have the right to determine the conditions upon which that privilege shall then be enjoyed.

"Where that policy can best be carried out by the states, carry it out by the states; where it can best be carried out by the Nation, carry it out by the Nation. My concern is not with the academic side of the question. My concern is in the employment either of the principle of states' rights or the principle of National sovereignty, as

will best conserve the needs of the people as a whole."

What is meant is, in a word, where an individual or corporation applies to Government for a privilege, and this be granted, let the grantee pay for it, and let it be understood that his privilege will last but for a limited time.

Should this proposal be made in the hearing of a "traveller from Mars," we should expect him to say, "Of course; have government privileges in your country ever been granted in any other way?"

To this inquiry we should be compelled to reply that this is exactly the way in which they have not, as a rule, been granted.

In these columns, not long since, (page 182) appeared an editorial entitled "Some Vicious Bills." Here was considered a series of bills before the first session of the present Congress, asking for grants of Government privileges in perpetuity, and offering only nominal compensation.

When our public domain was frittered away, and transferred in kingdoms and empires to railroads, was the above mentioned principle observed? What compensation did the Nation receive? And when will the grants terminate?

Our fast disappearing mineral wealth once belonged to the people; now only the fag end of it is theirs. The remainder has been transferred from them to individuals and corporations. What have the people received in return, and when will the grants end?

The principle enunciated by the President applies with peculiar force to natural resources; and of these, he was, of course, speaking. Natural resources are but an aspect of the earth, the basis of all organic life, human and sub-human. The President's statement suggests some interesting inquiries: Who own the earth? Upon what is their title based? How long will that title hold good?

We have heard of the tramp who was ordered off the duke's land, and

who thereupon inquired into his lordship's title.

"Where did you get this land?"

"From my father," answered the duke.

"And where did he get it?" asked the tramp.

"From his father," answered the duke.

"And where did your first ancestor get it?" asked the tramp.

"He fought for it," answered the duke.

"Then I will fight you for it," answered the tramp, who proceeded to suit action to word.

This whole question of rights to land was learnedly discussed in 1850 by Herbert Spencer in Chapter IX, of his *Social Statics*. He there reached the conclusion that the duke reached. His readers were left to draw, if they chose, the same inference drawn by the tramp.

Jefferson declared that "the earth belongs in usufruct to the generation at any time living upon it." And this apparently is the President's view. The application of this principle will seriously interfere with the time-honored custom whereby generations, long since gone, control, in fundamental ways, the generation living. It will interfere seriously with the process whereby the "dead hand" reaches forth from the grave and rules a living world.

The President's principle will, of course, be challenged. But let the wordy contest come. For wars on the forum may prevent wars on the field. In any event, they clear the air; and, with the modern growth of the trust and special privilege, the air must be cleared if the nation would escape the advent of evil days.

The Appalachian Bill in Congress

In his message of April 27 President Roosevelt said: "Forest reserves should be established throughout the Appalachian-White Mountain region wherever it can be shown that they will have a direct and real connection

with the conservation and improvement of navigable rivers."

On April 20 were introduced into the House the Pollard Bill, H. R. 21220; the Weeks Bill, H. R. 21221; and on April 28, the Lever Bill, H. R. 21357. Epitomes of these three bills appeared in Bulletin No. 39 of The American Forestry Association. No one of the bills was favorably reported.

On May 16, the Senate passed the Brandegee Bill, S. 4825. Its leading provisions follow:

The Secretary of Agriculture is to preserve navigability of navigable streams, to acquire lands more valuable for regulation of stream-flow than for other purposes, and situated on watersheds in Maryland, Virginia, West Virginia, North Carolina, South Carolina, Georgia, Alabama, Kentucky, Tennessee, New Hampshire and Maine. Minerals and merchantable timber may be reserved by owner, to be cut or mined under Government regulations.

The Secretary is to advertise for lands and accept lowest bids. No land must be taken over until State Legislature has consented, and ceded to the United States jurisdiction over offenses against Federal laws. Land titles must be satisfactory to Attorney General.

Five million dollars are made immediately available. The Secretary is to report annually to Congress on lands purchased, with cost.

Small agricultural areas included may be sold by Secretary in eighty-acre homesteads, jurisdiction over land thereupon reverting to State. The Secretary may authorize sale of products of lands acquired.

Lands acquired under this act to be held and administered as National Forest lands, under provisions of Section 24 of Act of March 3, 1891. The State to retain criminal and civil jurisdiction over persons, save for offenses against the United States. Twenty-five per cent of annual receipts from each National Forest to be paid to State for benefit of public schools and public roads.

Secretary may administer and protect private forest lands upon watersheds upon which are forest reservations; owner to cut and remove timber according to regulations agreed upon.

Senator Brandegee accompanied his bill with a fifteen-page supplemental report, Calendar Number 490. This report gives reasons why National Forests are necessary: 1. To protect

the watersheds of navigable streams; 2. To safeguard available water-powers; 3. To improve timber supply; 4. For health and recreation; 5. For purity of water supply; 6. For protection of soil; 7. In the control of floods; 8. The states cannot act; 9. Experiences of other countries show that the Federal Government must do this work; 10. The present a favorable time for action; 11. Proposed action is fundamental to any systematic plan of conservation of natural resources. It indicates the land needing protection, discusses the treatment of the region, the method of acquirement and cost of lands, and epitomizes the history of the movement for Appalachian National Forests.

Senator Teller spoke nearly two hours against the Brandegee Bill, and Senators Daniels and Newlands spoke for it.

On May 21 the House of Representatives passed a bill, H. R. 21986, known as the Scott Bill. Its title is, "A Bill to Enable any State or States, or With the United States, for the Conservation of Navigable Rivers, and To Provide For the Appointment of a Commission."

Following are the provisions of the bill: The consent of Congress is given for each state to enter into such agreement or compact, not to conflict with any law of the United States, as it may deem desirable or necessary, with any state or states to conserve forests and water supply of states in agreement.

One hundred thousand dollars is appropriated to enable the Secretary of Agriculture to co-operate, when requested, with any state or states by supplying expert advice on forest preservation, utilization and administration, and on reforestation of denuded areas. He is authorized to agree with owners to administer and protect private forest lands upon watersheds of navigable rivers, provided owners cut and remove under regulations for the protection of the forests in aid of navigation. The United States shall not be liable for damage resulting from fire or other cause.

A National Forest Commission, consisting of five Senators and five Representatives, is created to investigate connection between forest preservation on

watersheds of navigable rivers rising in White and Southern Appalachian Mountains, and navigability of said rivers, and to ascertain extent, if any, to which U. S. Government should acquire land, with probable cost, or whether Government should supervise watersheds without purchasing land. The Commission is to report to the President not later than January 1, 1909. It may expend twenty thousand dollars.

Representative Scott, Chairman of the Committee on Agriculture, accompanied this bill with report number 1700, on "Co-operation of States for Conservation of Navigability of Navigable Rivers, etc." In this, he apologized for the delay, extending throughout practically the entire long session, in considering a measure which he concedes has been "widely discussed and has awakened profound interest throughout the entire country." He stated four methods that have been suggested of handling the problem: 1, Exclusive state action; 2, U. S. Government co-operation, by advice and assistance, with states or private owners; 3, The exercise of Federal jurisdiction over privately owned forests on watersheds having connection with navigability of navigable streams; 4, Federal purchase of all lands necessary to protect watersheds of navigable rivers, and exercise over forests of rights and privileges of absolute ownership.

The Bill H. R. 21986 was, he said, drawn to meet in a measure each of these four proposed plans. He then explained the bill and recommended its passage, which promptly followed.

This bill is, of course, highly objectionable to friends of National Forests in the Southern Appalachians and White Mountains. It seeks to shift responsibility from Congress to the States, thus reflecting the view so often expressed by the Speaker. As the Boston *Transcript* puts it, it provides for a Congressional junket, enabling ten statesmen to spend the summer in the mountains, with two thousand dollars of Government money apiece for expenses. It staves off the issue on the assumption that more investi-

gation is needed, when the Congressional ship has already been loaded to the water's edge with information on every conceivable pertinent aspect of the case. Meanwhile, it permits forest slaughter, soil erosion, and stream impairment to proceed.

It is understood that the Senate will ignore this bill. The Southern Newspaper Publishers' Association, in convention at Charlotte, N. C., has recently gone on record, by unanimous vote, for the proposed Appalachian-White Mountain National Forests. Hon. John H. Small, representative from the First district in North Carolina, in an address before the American Cotton Manufacturers' Association at Richmond, Virginia, on May 20, said:

The only agency which can properly preserve these mountain forests is that of the United States. It is utterly impracticable for any single state, and equally so for any confederation of states. Any suggestion to the contrary comes from an enemy and not a friend of this great National resource.

Speaking of "powerful obstacles which block the way," he said:

There are no legislative obstacles so great which the American people in their might cannot remove. This can be done by continuing the propaganda of education so insistently waged by the American Forestry Association, and by your Association, as an active ally.

The feeling of the Cotton Manufacturers is shown by the following resolution, passed unanimously on the same day:

We, the American Cotton Manufacturers' Association, in convention assembled, hereby urge upon the Congress of the United States the passage, at this session, of bill H. R. 21357, or a similar bill, providing for the purchase, in aid of navigation, of forest lands in the Southern Appalachian and White Mountain regions, and also for co-operation between private owners and the Federal Government with a view of preserving the forests on privately owned land for the regulation of stream-flow in aid of navigation.

Congress is expected to adjourn in the week ending May 30th. If so,

and nothing further is accomplished this session, there will still have been gained the passage of an excellent bill by the Senate, and the development of public sentiment which should result in the rebuke at the polls, if not the actual retirement, of congressmen who have dallied with or obstructed a measure so generally recognized as indispensable to national well-being.



Some Western Criticisms.

The following editorial paragraph is quoted from the May 2 issue of *Field and Farm*, published at Denver:

"It listens big to read how a millionaire Senator has bought 12,000 acres of coal land in Colorado; but is it a good thing for the state, or a solace to posterity? The time is coming when the country will be owned, soul and body, by the millionaires."

Has it ever occurred to the editor of *Field and Farm* that in voicing sentiments such as this, and in continuing also to protest against the work of the Government in creating National Forests and mineral reserves (as proposed not long ago by President Roosevelt) a clash of argument occurs that speaks but poorly for the editorial bump of logic?

The proposition to extend greatly the work of the Government in establishing National Forests is, to many in the West, as to the proverbial red flag to the bull. So, too, is the proposition that the several states establish within their borders state forest and mineral reserves, though the latter proposition does not arouse such an intense degree of antagonism as does the former. Probably this is because propositions looking toward the establishment of state forests have been neither frequent nor strongly advocated; but this is by the way.

Now, the question resolves itself to this: A large part of the Western press, and a great majority of the people of the West, are violently opposed to the acquisition by individuals or

private corporations of vast tracts of timber or mineral lands. This is indicated in the paragraph quoted above, and the sentiment expressed therein is fairly representative of the opinions of a good majority of Western men. It is also a fact that the bulk of opposition to the establishment by the Federal Government of National Forests is in the far West. Forest conservation has its friends—and excellent ones, too—in that part of the country lying west of the Missouri River; but the bitter, vituperative and strenuous opposition to the Government's program comes also from that section. It is true, too, that propositions that have been made in the past for the several states to do their own work in establishing forest reserves and reserves of mineral lands—these to be held *in perpetuo* for the benefit of the whole people, and to be taken from the lands owned by the states and lying within their own borders—have likewise met with strong opposition; so strong, in fact, that no serious attempt has ever been made to put such a program into effect.

Now, what remedy do our protesting friends propose? So far we have failed to see or hear of any. All that has as yet come to our attention is a continuous performance of protest against everything. Protest against the segregation under individual or corporate ownership of tremendous tracts of timber and mineral lands; protest against the broadening of the National Forest scheme; protest against the establishment of a state scheme for forest and mineral reserves. And, with all the protest, not even the suggestion of a remedy. Does it not occur to these protestors that, if they have no remedy to offer, it ill becomes them to rail continuously against existing conditions?

There is no room for doubt that if the sentiment of the voting public in

any or all of the Western states were to be vigorously expressed the states would be forced to enact legislation looking toward the preservation and conservation of the natural resources upon or within the lands owned by such states. It requires only the expression of a crystallized public sentiment to secure the adoption of any legislation desired; and the fact that no such crystallization has taken place, and the added fact that proposals to this end have been bitterly opposed, would seem to indicate that the public—that is, the voting public—of the states in question does not want such legislation.

It is an equally patent fact, if one is to judge by expressions of individual and collective opinion and the editorial utterances of the newspapers, that many people of the far West oppose the Nationalization of forests, etc. Nobody denies the right of the Government to set aside National Forests when the land so set aside is Government land; nevertheless, the opposition to the establishment of National Forests continues vociferously, and it is the strongest in the far Western states. There is hardly room for doubt, either, that if the Western states would undertake the work of preserving the remaining forests and caring for them in a wise manner, safeguarding them against exploitation and conserving the timber within them for the fullest possible use, the National Government would have little to do there along the line of forest conservation. But the states will not do this; the objectors within the states are as strongly opposed to such steps as they are to the plan of National Forests. They offer no substitute plan; therefore it would seem "to a man up a tree" as if they had only themselves to blame for the other aggressions and abuses which so arouse their ire.



NEWS AND NOTES

Timber Owners Organize to Fight Fires

A most important economic movement of the times, which, as yet, has attracted little attention from the general public, is the organization of timber owners in different sections of the country, for protection against fires. The Washington Forest Fire Association, with headquarters at Seattle, has just elected officers for the year, this organization having 3,000,000 acres of forest under its control. Plans followed by the United States Forest Service for fighting and controlling fires have been adopted. Oregon and Idaho also have organizations of this sort, in the latter state a portion of the expense being paid from taxes received by the State Treasurer. One of the big western railroads has also taken steps to guard its timber properties from fires. Away over on the other side of the continent, the timber owners in Maine have begun to form a similar organization, and preliminary steps in the formation of fire-fighting organizations are reported from other sections of the country. When it is considered that forest fires have destroyed more timber than the lumbermen have cut, the wisdom of such moves is readily apparent.

NOVEL FORESTRY COURSE.

At the Massachusetts Agricultural College this year thirteen students are taking the course in the study of shade trees. This is an elective course of the senior year. It has been given for several years, and includes a study of all the factors which in any way touch on shade trees; for instance, tree warden laws, proper trees for street planting, transplanting and care of trees; the various factors that interfere with tree growth, such as soil conditions, macadamized roads and sidewalks; biological features such as micorhiza, etc.; the effects of drought, winds, lightning, direct and alternating cur-

rents, illuminating gas, and the atmospheric gases. Attention is also given to the study of the fungi affecting shade trees and shrubs, and some practical work in tree filling, chaining and bolting is done, together with treatment of cavities, and proper methods of pruning.

Possibilities for Turpentine in Northwest.

L. W. Hawley, expert on wood distillation for the Forest Service, has just left Washington for Oregon, Washington, Montana and Idaho, to investigate the possibilities of a future turpentine industry in the northwestern portion of the United States.

Mr. Hawley has taken with him a small distillation apparatus, which he will set up at various places in these states, distilling the different woods to determine their value in the production of turpentine. In this manner an accurate idea of the yield of extracts from the various woods can be obtained, and samples of the material will be sent to Washington for analysis and estimation of its value for use in paints, varnishes, and other naval stores.

There are at the present time in the Northwest, several wood distilling plants which are producing various grades of turpentine, wood preserving oils, and materials of a similar nature. It is believed that a careful study of existing conditions in this section will yield results which will give an accurate idea of the possibility of utilizing the enormous quantity of saw mill refuse now going to waste.

Proposed Summer Home for Teachers

Lewis C. Greenlee, for many years superintendent of public schools in Denver, Colorado, and lately elected president of a reclamation and development company owning lands in Routt county, Colo., has evolved a

scheme for providing a summer home and resort for members of the National Educational Association. His company proposes to dedicate to the Association a tract of land in Routt county, upon which members may build, and which will be capable of agricultural development, with the idea of providing a resort where vacations may be spent with as little expense as possible. The land lies along the eastern side of the company's irrigation ditch, running up into the mountains, and offers what is said to be an ideal location for summer residences, cottages or resort hotels. The Moffat Road, now approaching completion, taps the section from Denver, and Routt county affords some of the finest scenery, as well as magnificent farming, gardening and fruit-growing lands, to be found in the Centennial State. The proposition will be made to the Association at its annual meeting in Cleveland, Ohio, this summer.

New National Forest in Kansas

President Roosevelt has just signed a proclamation creating additions to the present Garden City National Forest amounting to 205,107 acres. This proclamation also provides that the original Forest known as the Garden City with the additions shall be called the Kansas National Forest. The additions will bring the area of the Kansas National Forest up to 302,387 acres.

The forest is located in Finney and Kearney counties, in the sandhill region of Kansas, on the Arkansas River. Its creation received the support of the entire Kansas delegation in Congress, and, through petitions, the support of industrial associations and citizens generally of the counties in which this land is situated.

The Kansas National Forest was created mainly for experimental planting, since the rapidly increasing demand for timber in the agricultural

communities adjacent has led the people to believe that this sandhill land, otherwise worthless except for a limited amount of grazing, can be made to produce timber. Fair success has been obtained with black locust on lands similar in character, and it is thought that further experiments will demonstrate that the entire sandhill region south of the Arkansas River can be made to produce timber.

To this end, the Forest Service has made arrangements to plant 65,000 seedlings of valuable hardwood species on this forest this spring. A new planting station at Garden City, to supply trees for future planting on this forest, was established March 1, on a tract of five acres of land which was leased from the County Commissioners of Finney county, for yearly rental of \$1 per acre. The annual capacity of this nursery will be 300,000 trees. The value of timber for fence posts, fuel, and other domestic uses, which it is believed this forest is capable of producing, is almost incalculable in that practically treeless country. It is unquestionable that, if the Forest Service is successful in these experiments, many private individuals will benefit from the results obtained by the Government, and plant trees for domestic purposes in connection with other work on their ranches.

Tree planting experiences in Kansas have been many and varied. Ignorance of proper methods of planting and caring for the trees and the frequent choice of stock entirely unsuited to the region brought many failures during the year following the enactment of the old timber claim law. There have been many successes, however, in tree planting, where landowners have exercised judgment and care in the work, and the fine groves of trees in the western part of the state give promise of the reclamation of much of the great stretch of land lying south of the Arkansas River, known as the sandhills.

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